Bradshaw Lecture
ON
THE CAUSES OF DISEASE.

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MR. PRESIDENT AND GENTLEMEN,—I am deeply sensible of the honour which has been done me in asking me to give the lecture to perpetuate the memory of Dr. William Wood Bradshaw. Some of the details of his life were given by my predecessor, Dr. Newton Pitt, in 1910, who describes him as cultivated, refined, but somewhat eccentric. He must have been much appreciated by his contemporaries, for he was granted a degree without examination by the University of Oxford in 1847, was elected a Fellow of the Royal College of Surgeons of England in 1854, and a Member of this College in 1859.

INTRODUCTORY.

I often think that benefactors who endow lectureships must possess a grim sense of humour, for they make at least one person once a year come to a block in the busy traffic of medical practice and cause him to think and, worse still, to put his thoughts into cold, relentless print. In the strenuous times in which we live at present a complete block is impossible, and as a result one's thoughts are constantly jostled; and this must be my excuse for the many imperfections of this lecture, in which I have found it beyond my powers to reach the high standard set me by my predecessors.

I have chosen for this lecture the old but none the less important subject, the Causes of Disease. I shall probably have nothing new to say, but in the exploration of the many new forests into which modern medicine has led us, with its many new names and many new methods, it is well to avoid not being able to see wood for trees. If the money expended and the labour involved in the administration of the National Insurance Act had been used to combat causes instead of effects, for my part I think it would have been ultimately of greater good to the community. If causes were more carefully considered there would not be the discreditable evidence so often given by members of our profession in the Law Courts, especially in cases under the Workmen's Compensation Act. If causes were more carefully weighed we should not have the ultra-specialist assigning the majority of diseases to causes peculiar to his specialty, the neurologist treating a sciatica really due to an impacted uterine fibroid tumour, the gynæcologist or the nasal surgeon performing operations on neurotic patients the seat of whose troubles is really in the brain; nor the abdominal surgeon operating for gall-stones when the patient is suffering from periodic bilious vomiting due to migraine; nor hear of successive operations on another patient on the colon, appendix, duodenum, and gall-bladder to cure pains due to the gastric crises of tabes dorsalis; nor advising the removal of a supposed gastric cancer because the patient was suffering from the wasting of Graves's disease—all instances which have recently come to my own notice.

My thoughts have been specially directed to this subject of causation by trying to discover the cause of that very distressing and prevalent affection, disseminated sclerosis, of which more anon, and also by reading a recent small volume by our colleague, Dr. Mercier, entitled "Causation and Belief," a book, if I may say so, of excellent merit, and, of course, of much clarity and infinite wit, and which, I think, should be read by every medical man.

DEFINITION OF DISEASE.

We must first have some definitions. I have been surprised to find no definition of disease which seems satisfactory. It is obviously the converse of health, which is defined by Professor Adami as a "state customary to a series of individuals in which they perform their functions easily and unconsciously. But much more than this is necessary to constitute health. A man with much increased blood pressure, another with compensated mitral disease, and a third with glycosuria may all perform their functions easily and unconsciously, but they are not healthy and would be rightly refused for life assurance. The changed anatomy and function of organ and tissue are of paramount importance as well as the man's feelings and present abilities. But in this connexion we are at once confronted with two difficulties. First, there is no such thing as a standard man, as no two people even of the same race or same family are exactly alike; but we can without difficulty imagine an average man who is a mean between others varying but little in structure and function. The second difficulty is that of advancing years, for after reaching a state of maturity a man's tissues and functions change and decline. Now, I should be sorry to include these changes as disease, to imagine that all of us over 50 years of age are in a state of disease. These changes are natural processes, like the falling of the leaves in autumn, and may be defined as those changes found on an average at any particular age in a particular race; it is partly on these normal average changes that tables of expectation of life are constructed. Abnormal changes due to age are, of course, those that occur years before they occur in the average man—the early whitening of the hair, early degeneration of blood-vessels, early changes in nerve tissue, and so on.

These two difficulties set aside, I think we may safely define *Disease* as that condition of an individual in which there is, apart from normal age changes, a harmful change of the structures or functions or sensations usually found in the average man of any particular race. This definition will include neurasthenia and hysteria amongst diseases, but will not, of course, include malingering.

DEFINITION OF CAUSE.

As regards Cause, the best definitions I know are those of Dr. Mercier, whose views I will put as shortly as possible. He first defines *Effect* as a change connected with a preceding action, or an unchange connected with an accompanying action (such as the unchanging steady movement of an engine) on the thing changed or unchanged. A *Result* is the changed state of a thing on which the effect has been produced. Endocarditis of the mitral valve is the effect of the action of germs on the valve; mitral stenosis is the result. A *Cause* is the action or cessation of action connected with a sequent change or accompanying unchange in the thing acted on. He then makes a strong point about the difference between cause and *Condition*. The latter is a passive state of or about the thing acted on by a cause and material to the effect. It may be a favouring condition where more of an effect will be produced by a cause if the favouring condition is present; or a necessary condition where an extra effect or an earlier effect is produced when the necessary condition is present.

Dr. Mercier points out that age, sex, race, time of year, and climate are frequently put down as causes of disease. But these are not actions but are passive states and are therefore not causes. The age of 60 years, the female sex, the negro race, the winter, the climate of Uganda are not causes of disease, but they are conditions in which certain actions especially or only occur and are therefore favouring or necessary to the effect produced. Strictly speaking, this is correct and in the close investigation of causes must be fully allowed for. But in a wider sense condition may be for convenience included in all the necessary circumstances precedent to an effect produced and in this sense Dr. Mercier himself recognises the term in his chapter on the causes of death.

METHODS OF ASCERTAINING CAUSES.

We must now consider shortly the methods of ascertaining causes. The five canons of inductive logic put forward by John Stuart Mill Dr. Mercier clearly shows not only to be unsatisfactory but often useless and often absurd and in their place he gives 12 methods which are worth quoting:—

1. Instant sequence of the effect on the action.
2. Subsumption of the case in hand under a general law.
3. Assimilation of the case in hand to a known case of causation.
4. Association of the action with the effect when other material action can be excluded.
5. Association when the association is of proved constancy.

6. Association when, though inconstant, the association is more frequent than casual concurrence will account for.
7. Association when, though itself inconstant, the associated effect has constant peculiarities.
8. Concurrent and proportional variation of the action and the effect.
9. Common rarity of the action and the effect.
10. Correspondence of a quality in the effect with a quality in the agent.
11. Coincidence in space of an action or a condition with the effect.
12. Coincidence in time of the action with the effect.

Instances of these methods are of course given by Dr. Mercier, but all of us can quite easily find instances in medicine, and can see the value of the methods in ascertaining the causes of disease. In many diseases in which the exact cause is not known, such as measles, Hodgkin's disease or tetany, we may make shrewd guesses by the use of these methods. But in other diseases, such as true tic-doulourcux, spleno-medullary leukæmia or sclerodermia, we have not sufficient knowledge of antecedents and no similarities with other conditions, so that at present no cause can even be guessed at.

Of the many fallacies found in trying to ascertain cause, one of the commonest is the *post hoc propter hoc* argument. This may be and often is perfectly true in the sense that a cause precedes an effect. But to be true a connexion must be shown to be established by one of the methods of causation "between the action that is *ante* and the effect which is *post*." But it cannot be too strongly asserted that mere sequence does not establish causation. A man strains himself while lifting a weight; he continues his work, perhaps, with some difficulty; two days afterwards he commences with pneumonia and dies, and a claim for compensation is put forward, and it is often most difficult to persuade a lawyer that there is no necessary connexion between the original slight injury and the death. A man cleans out drains from a dye-works and gets chrome eczema and chrome holes on the hands. He happens to vomit the same day that he cleared the drains; he continues to have dyspeptic symptoms and occasional vomiting and loses flesh, and a few months after dies from a gastric cancer, and without being able to show the slightest connexion (except mere sequence) between the injury to the hands and the gastric cancer a claim is made for the death. But it is common knowledge that legal compensation actions abound with such cases; and there is no doubt that the supposed efficacy of many drugs is falsely based on the *post hoc propter hoc* argument, the real healer being nature.

Coincidence.

Another fallacy, which is of such enormous importance that I think it worth while to dwell on, is that of pure coincidence. It depends, of course, principally on the fact "long ago pointed out by Bacon that there is in the human mind a peculiar tendency to dwell on affirmative and to overlook negative instances" (Fowler's "Inductive Logic"). To my mind this is the explanation of most of the curiosities of telepathy, thought reading, "dreams coming true," and of psychic research, and not unfrequently is the explanation of things being falsely ascribed as causes of disease. The number of coincidences in life is actually enormous, but relatively is only a very minute fraction of the myriads of thoughts, dreams, and sensations which continuously crowd our daily life awake and asleep. Think of the innumerable incidents which fall on the eye and the ear in a walk through the city; to the great majorty of these we pay no heed, but immediately one incident fits in with another a coincidence is established; we fix on this and remember it and very often call it, instead of a pure coincidence, an act of causation. Let me give some examples of pure coincidence.

On the morning of Feb. 14th, 1876, Elisha Gray registered his patent for a telephone at the Washington Patent Office; on the afternoon of the same day Graham Bell, quite independently in every way, registered his patent for a telephone in the same office. A few years ago a friend of mine was reading Canon Gore's book "Lux Mundi"; in order to keep the back clean she picked up from a table near by the discarded paper cover of another book and put it on the one she was reading; shortly after it was found that the paper cover's title was "The Light that Failed" by Kipling. A few weeks ago I casually opened a periodical lying on a hotel table and fronting me was a coloured print of Constable's Haywain; a few minutes afterwards I opened a box of cigarettes and in it found a print of the same picture.

In professional life coincidences are common; we all have "runs" of particular cases, or cases from particular districts or from particular doctors.

Four years ago I remember three cases of myasthenia gravis at one time in the Manchester Royal Infirmary, two of them being under my own care. About the same time I saw three cases of Bence-Jones's albumosuria within a few months. Recently I saw two cases of unrelated Thomsen's disease in one week, and the next week a case with all the usual signs of Thomsen's disease which had apparently come on after shell shock, but in whom I found no family history. A few weeks ago late one night I wrote a medico-legal report on a case of death from pulmonary embolism occurring in a man whose left tibia had been fractured by a falling stone while he was at work; the first case I saw the next morning was an officer with a pulmonary embolism from a fractured right tibia due to gunshot.

Coincidence or Causal Connexion?

In these cases of pure coincidence I am told by a mathematical friend that there is no formula which applies to them. Percentage is no test. Suppose the same 1000 persons to start at different times of each day from the East-end of London, walking at different speeds, and another 1000 to start from the West-end; the number of times each year that John Smith (coming from the East) will meet Thomas Brown (coming from the West) at St. Paul's may be quite considerable, and if no causal connexion can be shown will be pure coincidences. But William coming from the East may meet Mary coming from the West at St. Paul's only on two occasions, although each one passes that spot each day, but if the two meetings were pre-arranged by themselves or their friends the meeting is an act of causation. Similarly in disease; we sometimes find epileptics who have mitral stenosis, but these are two very common affections and are certain to meet as pure coincidences in the same individual fairly frequently. Trench fever is common, so are lice on the bodies of soldiers; and in the same way it must not be necessarily assumed that lice are the sole carriers or in any way the carriers of trench fever, although they may be one method of conveyance. I have seen a very great number of cases of disseminated sclerosis since the commencement of the influenza epidemic in 1889, but one must not assume that influenza is of necessity a cause of disseminated sclerosis.

Let us take now low percentages. Late nervous affections of the tabetic or general paralytic type are said to occur in about 7 per cent. of all persons who have had syphilis. Yet no one doubts the causal connexion for two reasons: first, that the observations are being constantly corroborated; and, secondly, that it conforms to the methods of ascertaining causes. In the epidemic of arsenical beer poisoning in the Manchester district in 1890 I had about 1200 cases of arsenic poisoning under my care; amongst them I had 16 cases of herpes, only 1·3 per cent. Was this a pure coincidence or was there a causal connexion? The latter certainly, for as a matter of fact, knowing that others had found herpes in arsenical poisoning, it was the presence of herpes which made me look for the arsenic. Actual pain and fine tremors are very rarely indeed found in lead-poisoning. Personally I have only seen these symptoms in two or three cases; but I have no doubt that there is a causal connexion, because others have seen them, though rarely; and, knowing that lead will cause motor paralysis, it is not unreasonable to suppose that it may rarely cause pain and tremor. Perforating ulcer of the foot I have only seen, I think, twice in diabetes mellitus, but I have no doubt it is secondary to the neuritis and changes in the sensory roots of the spinal cord found in that disease. Some years ago I published in *Brain* an account of four families, in two or more members of which disseminated sclerosis occurred. Since then I have had no fresh instances of familial incidence in this disease, and, although the disease is common, hardly any other observer has noted it as a possible family affection; therefore I am inclined to believe my cases were more or less coincidences. I also published a note in the *British Medical Journal* of instances in which I had seen disseminated sclerosis and Graves's disease in the same person; here, again, no corroboration being forthcoming, I think I was dealing with pure coincidence.

Diseases and Primary Causes.

A glance through any text-book of medicine will reveal an enormous number of diseases with particular "names." This

is as it should be; for without such large numbers of names we could not carry on our personal observation of diseases nor could we communicate our thoughts to others. For old as it is I do not think that Hobbes's definition can be too often repeated, that "a name is a word taken at pleasure to serve for a mark, which may raise in our mind a thought like some that we had before and which being pronounced to others may be to them a sign of what thought the speaker had or had not before in his mind." (And I should like, in an aside, to say that I consider it an unwarrantable crime for old names to be altered or used in different circumstances without very full justification. "Cursed be he that removeth his neighbour's landmark.") A further study of all these diseases will show, however, that the things that cause them can be narrowed down to a comparatively few classes, so that from a purely prevention point of view the number of actual diseases, considered as primary and not as regards their final effects, is similarly few. For instance, most diseases of the heart are not primary, but are the final results of some infective process; the same thing applies to most glandular affections; liver diseases are often circulatory or due to some poison; very many brain affections are due to circulatory troubles, and diseases of vessels to premature old age, and so on with any other system, the skin, the kidneys, the lungs, or the spinal cord. One has only to think of the numerous diseases set up by three primary causes—alcohol, tubercle, and syphilis—to realise the truth of this.

As an example of remoteness of cause and effect the following may be given.

A few weeks ago I was asked to see a lady who had recently been operated on successfully for an hour-glass stomach. But she insisted that she could not walk and remained bedridden. I was told this was due to hysteria, presumably post-operative. A short examination showed that she was a marked example of combined postero-lateral sclerosis which had been slowly coming on for two years, and was a remote effect of an original gastric ulcer with subsequent alimentary disturbances and anæmia.

A HEALTHY COMMUNITY: PROBABLE DISEASES.

Let us suppose 1000 healthy men and 1000 healthy women, each aged 20 years, free to marry, with no hereditary taint, put to live in a perfectly healthy island with sufficient flora and fauna to maintain life, and not under a fantastic communistic government, and let us try to imagine from what diseases they will suffer and from what they will die.

Theoretically we may suppose that none of these people will have any disease, and that they will all die aged 100 years owing to the natural processes of age. But as practical physicians, not treating human beings as pure pieces of machinery, we know that no two human beings are exactly alike either in structure, functions, habits, or feelings, and this being so every person responds differently to his surroundings, and therefore some of the inhabitants of our island will suffer from various affections and the ages at death will vary considerably. It will facilitate my suppositions if we agree to include in our study not only the original 2000 inhabitants, but also the next two or three generations, without, of course, any admixture from the rest of the world.

Injuries.

Injuries will inevitably occur. Of purely so-called surgical injuries, varying from burns to fractured skulls, I need not further speak. We must also include injuries due to childbirth, those to the mother and those to the child, the latter partly asphyxial but principally resulting in the many types of birth palsy, and not unfrequently in some types of epilepsy and perhaps of mental deficiency. Epilepsy in adults, osteo-arthritis, and probably new growths, are often mere end results of previous injuries or irritations. Cold and heat applied externally may, of course, cause injuries, whether they result in frostbite or in burns, and it is not unreasonable to call them injuries when they produce other effects. Heat will cause heat syncope, and the sun will cause that form of sunstroke called by Sir Patrick Manson "sun traumatism." I particularly wish to dwell for a moment on the effect of cold. We are all, I think, prepared to admit that "getting cold" produces a condition of lowered vitality which allows certain germs to act and effects occur, and in our broad use of the word *cause* cold would be a cause of these diseases But apart from germs, will cold or chill cause disease? Personally, I think it may. Take the case of a man who has been "wet through" and had to remain in his wet clothes until he felt chilled. I am prepared to believe, until fresh evidence is forthcoming, that he may as an effect have a parenchymatous nephritis, in a pure case of which I know no evidence which connects it with a germ growth. Again, I am a firm believer in the bad effects of a "draught." The breezes of a mountain top may harm no one, but sitting in the draught from an open window is, to my mind, a pernicious habit. It not only may for the time lower resistance, but can undoubtedly, quite apart from germs, so far as evidence goes, cause facial paralysis and brachial neuritis. I have seen paralysis of muscles supplied by the external popliteal nerve so caused, and in one case a paralysis of the muscles supplied by the fifth cervical root, and I think it likely that many cases of sciatic neuritis are due to cold pure and simple.

Food.—Poisoning.

Food being of prime necessity, I will consider it next. Results of improper feeding will sooner or later appear on our island. Practically each person will differ from every other in the quantity and quality of the food he takes. Some will naturally require more food than others; some will have healthy or unhealthy likes or dislikes for certain foods; others will have food idiosyncrasies; others, according to inclination or opportunity will take too much food, others too little, and so will arise obesity (the commencement of many diseased conditions) or emaciation. Probably many abnormalities of blood pressure are due to improper feeding. Some will bolt their food, causing dyspepsia of various forms. Some may get diarrhœa, others constipation, with its many undesirable effects; but few physicians will, I think, be prepared to accept the formidable and curious catalogue of the effects of intestinal stasis as tabulated by Sir Arbuthnot Lane. From improper proportion of food stuffs some may develop scurvy and others (in infancy) rickets.

Cases of poisoning will certainly occur on our island, gaseous, liquid or solid from animal, vegetable, and mineral sources, and we must include poisoning from putrid foods. We may concede that tobacco smoking is indulged in, and we may get various acute, and more important still chronic, effects from over indulgence, effects which are commoner than is usually supposed. Sooner or later alcohol will be distilled and taken, and at once we add enormously to the number of diseases produced, with possibly also effects on the offspring. Here may also be mentioned poisoning from intrinsic sources, such as presumably may be the cause of pernicious anæmia, rheumatoid arthritis, combined postero-lateral sclerosis, possibly of disseminated sclerosis, and the numerous diseases resulting from altered secretions from glands, ductless and otherwise; some of these poisons may originate from germ growth, others from altered functions and altered metabolism, two classes to be considered later.

Occupation.—Stress.—Metabolic Variations.

Our islanders must, of course, work. If we suppose the work is agricultural, and if more or less evenly divided, no special diseases should arise therefrom. But sooner or later some will work less than others either from getting unduly rich or because of indolent habits. The former may become obese and indulgent, the latter will suffer the usual penalties of underfeeding and also perhaps of depleted homes and of overcrowding, with their usual results to themselves and their children. Sooner or later also other industries will arise which will again by degrees become more and more specialised, and we are at once introduced to the numerous diseases of occupation about which so much excellent work has been done in recent years.

With increased work there will develop (partly as a result of competition, partly of habit and partly of necessity), worry, hurry and stress, often much increased by the tyranny of the insistent telephone and the irritation of the rushing wheel. Stress especially affects the digestive, the circulatory, and the nervous systems. The affections set going by improper or insufficient food, by hurried and irregular meals, by hyperchlorhydria (often, I think, the result of worry and rush) and by constipation I have already touched upon. Functional affections of the heart, tachycardia, palpitation, and actual cardiac dilatation may result from stress. More important still, as leading to so many affections often in the end fatal, we get the increased blood-pressure which in industrial communities is so enormously common and tends to early unnatural

senility. Equally common are nervous affections, hysteria, neurasthenia, psychasthenia, and insanity. I believe that acute congestion of the brain may occur causing prolonged unconsciousness or even delirium, and for my part I am inclined to think that Graves's disease is primarily a nervous affection and not primarily a disease of the thyroid gland. It is a difficult question to decide whether these acquired results of stress are handed down to appear as nervous symptoms in the offspring, for it may be that these results would only appear in certain members of our community who are of a more nervous temperament than the others, and that it is merely the temperament which is handed down. Perhaps some signs in the children may be the results of imitation from living in a household where rush and stress are always occurring. One type of stress, not, I think, sufficiently dwelt on, is that caused by nursing sick relatives through long illnesses, especially when the illness ends fatally. This, of course, occurs principally in women, and is one of the most potent causes of functional nervous disturbance that I know. It is one of the tragedies of life to see a woman gradually becoming more worn, more faded, and less likely to marry as the result of being tied hand and foot to another's sick-bed; and the worst of the tragedy is that very often it is inevitable and "none can succour her."

We have assumed that each of our inhabitants differs from the other, and therefore we may further assume that each will functionate and metabolise differently. For some unknown reasons these alterations in function and metabolism may lead to diseased conditions. Such are obesity, diabetes mellitus and insipidus; gout, hyperchlorhydria, and some altered digestive processes, including constipation; altered functions of the ductless glands, and possibly the tendency for certain secretions and excretions to form calculi. Some altered blood conditions, such as chlorosis and polycythæmia rubra, belong to this group.

Age.

We must now consider abnormal changes due to age. It is permissible here to include congenital affections (apart from those due to injury), many being due to abnormal or arrested development. Later changes may be either general or local. General changes seem to fall more especially on the circulation, leading to diseases of the heart and blood-vessels, with subsequent affections of the brain and spinal cord, with simple-mindedness, loss of memory, definite mental disease, brain and cord softenings, and hæmorrhages. (I would like to draw attention at this point to senile paraplegia from deficiency of circulation in the lumbo-sacral cord described by Sir William Gowers, and not, I think, sufficiently recognised.) Together with these vascular changes must be included the granular kidney, with its multitudinous range of symptoms and signs.

Local changes may affect many organs. Those of the hair and skin are obvious. In the nervous system I would include the following diseases: paralysis agitans, senile tremor, adult chorea, amyotrophic lateral sclerosis, progressive muscular atrophy, and chronic anterior poliomyelitis; amongst mental affections certain of the incurable adolescent insanities which rapidly pass into incurable dementia and various senile insanities. Early degenerations of ductless glands are manifested by myxœdema, and perhaps by some types of Addison's disease; early senile changes in the sexual organs by an abnormal menopause, early loss of sexual power in men, and by early changes in the prostate gland. Early changes in the eye may cause too early errors of refraction or affections of the lens, while changes in the ear may set up deafness or labyrinthine vertigo or tinnitus.

The important point about all these affections is that they are absolutely incurable. In the case of myxœdema the symptoms and signs can be removed by drugs, but the condition on which the symptoms depend remains the some.

Neoplasms.

We must now consider the question of neoplasms, and I will take Dr. Powell White's definition that a neoplasm is an abnormal mass of cells, tissues, or organs resembling those normally present but arranged atypically; it grows at the expense of the organism without subserving any useful function. Teratomata due to faults of development will almost certainly occur in some of the descendants of our original islanders, and also, one must suppose, as no two of our community are alike, that simple tumours will occur, such as warts, moles, fatty tumours, outgrowths of bone or of cartilage. But what shall we say of malignant tumours? Such are not always hereditary, and no one has yet proved that they are in any way caused by germs. So far as I have been able to observe, the commonest antecedent of large numbers of malignant growths is injury, including, of course, irritation. If we say for the sake of argument that it is a cause then we must, I think, certainly admit that malignant growths will occur in our island. But there is obviously something else: everyone suffers, if not injury, then certainly irritation, even if it is only the daily passage of fæces. But not everyone suffers from malignant growth; the unexplained factor is either another cause, or much more likely some condition. So important does this seem that I would urge that research workers on the etiology of new growths would do well to turn aside from the search for the active cause and seek out the condition which allows the active cause to produce its effect. If this necessary condition, whatever it is, cannot occur on our island we shall have no malignant growth and the contrary.

Parasitic Diseases.

I think we must assume that our island will not be free from parasitic diseases. It may be conceded that it is an island in a temperate zone, so that we have not to consider those greatest advances of modern medicine conducted often under enormous difficulties, discomfort, and danger by our brethren in tropical countries. I am not sure that we can exclude flies, fleas, bugs, and lice from the fauna of the island, however glad we should be to do so, and they may act, not only as direct irritants, but as disease carriers. Other animal parasites such as the itch insect and the various intestinal worms we may reasonably exclude.

Diseases due to Micro-organisms.

We almost certainly cannot exclude germs, for even in non-pathogenic states they are apparently necessary for the continued existence and for the decay of plants and animals. No one knows how the first germ started, but the more one wonders how the first germ became pathogenic the more fascinating does the subject become. I greatly regret that my ignorance of modern bacteriology will not allow me to discuss the matter as I should like, but I venture to refer to the interesting address on "The Nature and Degree of Specific Differences amongst Bacteria" given by Dr. Andrewes to the Pathological Section of the Royal Society of Medicine on Oct. 21st, 1913.[1] There he points out that generic differences amongst germs are probably of great antiquity, and that certain small genera, such as *Bacillus anthracis*, *Bacillus mallei*, *Micrococcus melitensis*, are very fixed, but that other large genera, such as the streptococci, the diphtheroids and the coli-typhoid group, are very variable and show a readiness to gain or lose their physiological characters under the direct influence of their environment and that in many cases by artificial means a non-pathogenic germ may become pathogenic and vice versa. This subject was also fully dealt with by Professor Adami in his recent Croonian lectures, in which striking examples were given.[2]

It is highly probable that we all keep on the premises, so to say, what I will call domestic germs, which, as a rule, remain tame, but granted certain conditions of the host, such as starvation, fatigue, or exposure to cold, they become wild and cause disease. Such, for instance, are probably the *Micrococcus catarrhalis*, the pneumococcus, the staphylococcus, the *Bacillus coli*, and the germ of rheumatic fever.

Other germs, such as the tetanus bacillus, the *Bacillus aerogenes capsulatus*, and many of the bacteria of putrefaction, perhaps normally present in the soil, only become pathogenic if they are put into suitable surroundings. I am told that there is a possible family connexion between a bacillus growing in Timothy grass, through the bovine to the human tubercle bacillus. Other bacteria and protozoa may live in perfect harmony with their hosts (such as *Bacillus pestis* in the rat-flea and certain protozoa in insects and birds), but are highly pathogenic in man.

Other micro-organisms living in the human body belong to groups which seem to have their members closely allied, but in which some are non-pathogenic, others highly pathogenic, and in which quite possibly the latter may have arisen from the former. Such, for instance, are certain organisms of the throat and nose closely resembling Weichselbaum's bacillus; and, again, the enteric group, varying from *Bacillus fæcalis alkaligenes* to Gaertner's bacillus, the paratyphoid, and the typhoid bacillus.

[1] THE LANCET, 1913, ii., 1239.
[2] THE LANCET, 1917, i., 921, 961; 1917, ii., 20.

So that although we may not allow that certain very fixed types such as the germs of syphilis, measles, scarlatina, or small-pox would affect our islanders without introduction from overseas, it is reasonable to suppose that many diseased conditions due to germs may arise within.

Heredity.

The last class of possible causes of disease is heredity. Our 2000 persons we have supposed to be free from inherited taint. Is it possible for any of the first generation of their offspring to inherit disease conditions or tendencies owing to the habits or environment of the parents? This question has been so fully dealt with in Professor Adami's recent Croonian lectures and decided in the affirmative, that it is almost unnecessary for me to touch upon it, except to say that I thoroughly believe such inheritance may occur. And whether it is due to an action on the somatic plasm or the germ plasm is a matter of more or less indifference to the physician or to the hygienist, and I certainly do not propose to deal with what the late Sir Jonathan Hutchinson calls the logomachy of Weismannism. I think it quite likely that alcohol and lead poisoning in the parent may affect the offspring. Nor does it seem unreasonable to suppose that the effects of under-feeding or over-feeding may have their results in the children; or that such infective conditions as we have allowed may develop in our island should produce an hereditary lessened or increased immunity. And if we consider a few more generations we can easily see how many metabolic and nervous diseased states may result. But I shall consider hereditary disease again in a few moments.

Summary of Causes.

I have now shown how in our community of originally healthy persons and their progeny for, say, two or three generations disease may occur, and deaths at varying ages may result without any contamination from the outside world, and I have classified the causes of these results into:—

1. Injury.
2. Food and feeding.
3. Poisons.
4. Occupation.
5. Stress.
6. Abnormal metabolism.
7. Abnormal age changes.
8. Neoplasms.
9. Parasites.
10. Heredity.

It goes without saying that the percentage of deaths from natural changes due to age will be much higher than in England to-day,

Effects of Immigration.

If we now allow unrestricted immigration into the island we shall not introduce any new cause of disease, but we shall much intensify at least three of our causes—namely, stress from increased competition, parasites, and heredity. Those parasitic affections will especially act as causative agents which are of fixed types, such as syphilis, tubercle, the exanthemata, and so on, and we shall presently see what an enormous factor the parasite is in the production of disease.

HEREDITARY DISEASES.

The subject of hereditary diseases must be considered in more detail. They can be roughly classified into eight groups: 1. Direct infection, of which syphilis is the one example, though some, such as Hutchinson, are prepared to believe that tubercle may be actually conveyed into the ovum. 2. The possible results of extrinsic poisoning in the parents by such agents as alcohol or lead. 3 Structural changes. These may be the obvious external changes, such as supernumerary or webbed fingers and toes, coloboma, or albinism. Or they may be internal structural defects, such as found in hæmophilia, and perhaps myotonia congenita and amyotonia congenita should also be included; or latent structural defects which show themselves later as various skin diseases—psoriasis, lichen xeroderma, urticaria, or chilblains. For those who believe in the heredity of cancer, and I think most clinicians do, the unknown latent conditions underlying the affection may be perhaps included in this group. 4. Altered metabolism, as, for instances, gout with its numerous manifestations, of which some only may be handed down, diabetes, and obesity. 5. Idiosyncrasies to certain foods or odours. 6. Tendency to germ infection, possibly from some hereditary lessened immunity. The great example of this group is, of course, tuberculosis. But I wish to take this opportunity to emphasise the enormous influence of heredity on acute rheumatic fever, an influence which I do not think is sufficiently pointed out. To my mind it is of equal importance as regards ultimate human suffering to tuberculosis. The more one inquires into the family history of rheumatic patients the more one is impressed with the number of families in which the parents, especially perhaps the mother, and the brothers and sisters have been affected with rheumatic fever, valvular disease of the heart, with chorea, or with various very definite rheumatic skin affections, such as erythema nodosum, with purpura or with that variety called Henoch's purpura which personally I believe to be merely a manifestation of rheumatism. 7. Nervous irritability or instability. In this group we have, *par excellence*, epilepsy, habit spasm, stammering, migraine (on the sensory side), asthma, the alcoholic habit, the various types of neurasthenia and certain insanities, many being of the curable type. 8. Tendency to abnormal age changes, in which I include certain insanities of the progressive incurable type, such as incurable adolescent insanities and early senile insanities; adult chorea; Friedreich's ataxia and various types of myopathic paralysis, including family peroneal atrophy; and finally, and most important, the changes produced by hereditary increased blood pressure with early arterio-sclerosis.

Now it will be at once quite rightly argued that to call a disease hereditary does not explain its cause. The heredity is generally only a condition, and some of the other nine classes of causes have to be brought in as factors before an effect is produced. But the importance of heredity in determining the future of a race is so great that it is quite legitimate, I think, to give it a place in my list.

CONSIDERATION OF ENGLISH MORTALITY TABLES FOR 1913.

We can now suppose that by unrestricted immigration and in the course of many generations the health and disease of our island has reached the condition in which England is to-day. In dealing with this we have unfortunately only very imperfect statistics of morbidity. We can obtain roughly the number of insane and the types of insanity, a class more cared for by the State than any other; or the numbers and character of certain notifiable infectious diseases, but that is all. For other information we must turn to the mortality tables of the Registrar-General. These are notoriously imperfect, depending, as they do, on certificates of death, which are, I am afraid, sometimes so worded as to give as little information as possible. To show how little they indicate real disease incidence, only 1800 deaths are attributed to acute rheumatic fever, which with its sequelæ is one of the most potent causes of disease; only 1200 to rheumatoid arthritis, another common affection; only 2000 to syphilis; whereas 26.000 are classed as syncope, merely the final cause of death of many different diseases.

But in spite of these defects the mortality tables deal with such large numbers that some hint, at any rate, is afforded of the morbid state of the community, and they are therefore worth examination. I shall take the year 1913 (so as to exclude war conditions) and shall only give approximate figures. There was a total of 500,000 deaths.

Of these, 134,000 (over one-fourth) were due to infectious diseases directly, and to these should really be added an enormous number of deaths ascribed to heart, lung, kidney, and nervous diseases, the primary cause of which was germ infection. Of these 134.000, 50,000 (one-tenth of the whole death-rate) were due to tuberculosis in some form, 37,000 to pneumonia, 10,000 to measles, 9000 to epidemic diarrhœa, 6000 to influenza, and 5000 to whooping-cough. 46,000 were attributed to respiratory diseases (excluding pneumonia), of which 39,000 were due to bronchitis, but this is very frequently merely a terminal phenomenon. 39,000 (nearly one-twelfth of the whole) were due to cancer or other forms of malignant disease, 38,000 to disease of the blood-vessels, 30,000 to diseases of the digestive system, 27,000 to nervous diseases, 27,000 to heart disease, 26.000 to syncope (which is again a terminal phenomenon, but may include many valvular affections of the heart), 20,000 violent deaths, 15,000 to Bright's disease, and 12,000 to atrophy and debility (a classification of no value). There were 18,000 premature births. Old age is accredited with 30,000 deaths, or one-seventeenth of the whole.

As I have said, these figures give us some hint of disease conditions, but certainly nothing more than a hint of prime causes. For instance, three most potent prime causes have very low figures—venereal diseases, 2000; alcoholism, 1900; and rheumatic fever, 1770. I can understand a certain diffidence in entering syphilis or alcohol as a prime cause on a death certificate, but there seems to me to be no excuse

for not naming acute rheumatism, except, perhaps, that it is even not yet sufficiently recognised how slight, especially in children, its manifestations may be, nor that chorea in children is for all practical purposes a sign of rheumatic fever, and, finally, that the enormous preponderance of cases of organic diseases of the heart valves is due to previous acute rheumatism.

It is interesting to compare my list of causes of disease with these figures, however imperfect and unsatisfactory, of the causes of death, to imagine how many of the 38,000 deaths from disease of blood-vessels were due to abnormal old age or to stress and how many to syphilis, what proportion of the 30,000 ascribed to the digestive system was due to food and feeding, and what proportion of nervous diseases was to be attributed to germs, to stress, to abnormal old age, or to heredity.

DISSEMINATED SCLEROSIS.

A disease in which I have been interested for years is disseminated sclerosis. It is in my own personal experience almost the commonest of organic diseases of the nervous system in which morbid changes can be found. It is a most distressing malady, not only to the patient, but also to the physician, for it comes on without any known cause, principally affects those in the full bloom of life, is no respecter of persons, and has a most crippling effect for years before it causes death. In my own experience it is much more common in women.

Very frequently, indeed, much more so than is generally supposed, it first affects the optic nerve rather rapidly; this affection is generally temporary and may be followed by a long intermission, often lasting years. With or without this initial symptom sensory symptoms, often very indefinite, occur, and rarely there may be severe pains not unlike those of a definite neuritis. At the same time or later there are disorders of motion, which may be slight, like an indefinite ataxia, or much more marked from affection of the pyramidal tracts or of ascending nerve tracts; very rarely actual wasting of muscle may result. A very marked feature of the disease is the occurrence of intermissions and remissions, the longest intermission, as a rule, being between any early eye symptoms and the sensory and motor phenomena; so long, indeed, is this interval that unless closely questioned patients never mention the original eye symptoms and certainly never connect them with the subsequent symptoms.

Causation.

Pathologically the lesions are very widespread and their locality points to something distributed by the lymph in the vessels or cerebro-spinal channels, or by blood in the blood-vessels, and probably more immediately by the former. The cause, whatever it is, has a predilection for the medullary sheath and the neuroglia, which are the parts primarily affected, and apparently the chronic inflammatory changes are secondary. The astonishing thing is the very sharp limit to each diseased spot, one indeed so marked that Strümpell supposed, but not on sufficient grounds, that the disease is largely of an endogenous nature due to a congenital abnormality of those parts affected, and that in this way a multiple gliosis results. I do not think some interesting observations made by my colleague, Dr. Williamson, in his work on "Diseases of the Spinal Cord," have been sufficiently noticed. He says:—

> "The shape of the patches and their regular margins in disseminated sclerosis are suggestive of the infiltration of the nerve structures with a fluid of destructive character, the margins of the patch being determined by *physical conditions*. If a spinal cord which has been hardened in Muller's fluid be touched on its external surface or on the cut surface of a transverse section, with a minute drop of deeply coloured fluid such as a strong solution of aniline blue-black, the fluid diffuses itself into the cord substance, and a stained patch is formed with a fairly regular, curved, clean-cut margin, a margin which passes through the various structures of the cord abruptly and indifferently, and thus resembles that of a patch of disseminated sclerosis. This fact is suggestive of the patches being caused by the infiltration of the nervous system with a toxic fluid, their shape and margin being determined by physical conditions."

In a footnote he adds:

> "Alcohol and several other chemical fluids have the power of dissolving out the white substance of Schwann from the nerve fibres of specimens of the cord and brain kept in these fluids for long periods, whilst the axis-cylinders and other structures are left. Thus a microscopic appearance is produced on section which somewhat resembles that of one form of the sclerosed patches. This fact is of interest, though the disease has no relation to alcoholism."

I think Dr. Williamson's observations certainly suggest that the toxic agent may be in the cerebro-spinal fluid.

If we use our tables of causation of disease we can rule out injury, food, occupation, stress, age, neoplasms, and heredity; also all extrinsic poisons. But we cannot set aside intrinsic poisons, nor altered metabolisms, nor parasites growing either in the nerve tissues or forming toxins which act on the nerve tissues. It was a long time before it was proved that acute anterior poliomyelitis was due to a germ, and we do not know at the present time whether the long-drawn-out and peculiarly intermittent symptoms of myasthenia gravis are due to germs, altered metabolisms, or intrinsic poisons, the only definite effects found being lymphorrhages in the muscles and some fatty degeneration of an enlarged thymus gland; and although of recent years the *Treponema pallidum* has been found in the brain of general paralytics, it seems more probable that the essential changes of this affection and of tabes are due to the toxin rather than to the local growth of the parasite.

Consideration of Possible Causes: Need of Research.

On the whole, by subsumption of the case in hand under a general law and by assimilation of the case in hand to a known case of causation, it seems certain that disseminated sclerosis is caused by a poison acting on certain special nerve tissues. If this is an intrinsic poison, which I am quite prepared to believe, it is probably either a perverted internal secretion or a poison derived from the alimentary canal, possibly as the result of constipation. In this connexion it is most important to keep in mind the postero-lateral changes found in the spinal cord in diabetes, pernicious anæmia, and many exhausting diseases. If from a germ, is it from the germ of some known fever, such as measles, typhoid fever, or influenza? I think from the previous histories this can be at once answered in the negative. Or may it occur as a late result of *any* previous germ infection independently of nature? I think this should also be answered in the negative, not so much because some of the patients say they have never had any previous germ infection (in which they may be mistaken), but more because it seems to me that from analogy it is highly improbable that a disease which in spite of its many varieties has so very distinctive a character both clinically and pathologically can be caused by any odd germ or germs which may have previously affected the patient. It may be finally noted that the disease resembles in many respects those nervous affections caused by syphilis, although we know that syphilis is not its cause, nor do the pathological changes resemble those produced by syphilis. But in its early affection of the eyes, its widespread distribution of lesions, its intermissions and remissions, and its long-drawn-out duration, the similarity is striking.

If due to a germ I am convinced it is a specific germ as yet quite unknown. Whether the intermissions and remissions are due to the continual presence of the germ in the body with varied powers of immunity from time to time, or whether to fresh infection is not known. If due to an intrinsic poison the remissions would, of course, be due to the manufacture and absorption of fresh masses of poison.

I am sorry to have to confess that in spite of minute inquiries into the previous histories of large numbers of cases of this disease I have so far entirely failed to elicit any evidence of any common factor, although my questions have covered a large field. There is evidently another field to explore, and I would strongly recommend to young members of our profession that here is a subject of research well worthy of attention and in which the discoverer of the true cause will gain a rich reward.

OTHER DISEASES.

Another common and very distressing affection which needs urgent investigation as to its real cause is rheumatoid arthritis, for although I am willing for the present to admit that it is due to some toxin, this is by no means proved. Nor is it known if it is due to a germ toxin or to some intrinsic poison arising from imperfect metabolism.

Epilepsy and migraine, two very common and disabling affections, I have classed in the hereditary group; but how glad we should be to know the real cause.

Two other diseases, fortunately not common, I find a difficulty in classing—namely, spleno-medullary leukæmia and true facial neuralgia. The former seems allied to

lymphatic leukæmia, which in many respects, especially in its frequently rapidly fatal results, resembles a germ infection; but in symptoms and course spleno-medullary and lymphatic leukæmia are so different that one sometimes wonders why they have generally been described together, unless it is that both are due to the same cause, but one running a very acute course, the other a chronic one, just as may happen in some other germ diseases, as, for instance, tuberculosis or glanders.

I have narrowed down diseases from the point of view of cause into ten groups only. This may appear surprisingly small and surprisingly simple. Allowing for that latitude which is always necessary when looking at very many objects from a large standpoint, I do not think I have taken many liberties in putting any particular disease into any particular group, although I do not pretend that the classification is one strictly conforming to the logical laws of classification. But I think the grouping is a convenient one, and I trust that on testing it will be found to stand criticism, and may be helpful in enabling us to steer a true course to reach the haven of real cause, and after reaching it to perform our next and highest duty, real prevention.

THE LATER HISTORY OF CASES OF GUNSHOT WOUNDS OF THE CHEST, WITH RETAINED MISSILES.

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THE question of what becomes of soldiers who have been shot in the chest and in whom the missiles are still present is one of great importance, as it bears directly upon the treatment of such cases. Should such missiles be immediately removed or should they be left alone? are the questions which are being much discussed at the present time. In a general way it may be said that among the French medical officers the tendency is frequently to attack such cases surgically, while amongst the British practitioners a more conservative policy is usually adopted.

The matter can only be settled when we have sufficient data to enable us to form an opinion as to what harm such foreign bodies do when left *in situ*, and also we must know what is the immediate risk to life of active surgical interference. This war is, unfortunately, providing us with only too much material upon which to form such opinions, and in the meantime, until great masses of statistics are available, as many cases as possible may be placed on record to help in this direction.

The Present Investigation.

For some months now I have been endeavouring, at the suggestion of Lieutenant-Colonel T. R. Elliott, to collect notes of patients in the Canadian hospitals in England, who have undoubtedly got foreign bodies in the chest, as shown by X ray examinations, and, although the list is still a small one, I give it as an early contribution to the subject. A large number of cases have been seen in the hospitals who have not yet been finally disposed of, but these are not included, as it is the final fate of such cases that we wish to ascertain.

In each of the cases in the list the X ray findings are given, and it will be seen that I include all cases in which the foreign body lies deeper than the ribs, so that in some instances these are not in the lung at all, but it seemed wise to include them in the series.

It will be observed that there were only two deaths in the list, and it is interesting to note that these two patients had been operated upon for the late removal of the retained foreign body. In one of them (No. 9) an abscess had formed round the offending missile, so that in this case an operation was urgently required, but in the other instance (No. 13) the patient was apparently well, and it would probably have been wiser, as the sequel showed, if he had been left alone. In a paper in THE LANCET of Sept. 8th last, by Colonel Elliott, there is a list of 170 cases of gunshot wounds of the chest, in which the after-history had been traced, and the only case that had a fatal issue in England was one in which there had been an operation for the removal of a rifle bullet from the lung. In 51 of his cases a foreign body remained in the chest, and Colonel Elliott does not think that this increased the gravity of the prognosis in any instance.

As regards the disposal of our 50 patients, 12 have been invalided to Canada or Australia or have been discharged as permanently unfit. One was tuberculous. Two died (as already mentioned, after operation). Three were categorised as "C 3" or "permanent base duty," 4 went to "light duty," and the remaining 29 were sent to full duty, "A 3," or "Command Depôt," where they would soon be considered fit to return to their units. Thus out of the 50, 36—i.e., 72 per cent.—were fit for some military duty, and only 14 were lost to the Army. The different ways of disposing of the patients is due to the fact that some were imperial men, while the rest were from overseas.

There must now be an immense number of these cases back at the Front and on other military duty, and yet how seldom is it that they are again invalided on account of disability resulting from the late effects of the retained foreign bodies. During my work in the past year in Canadian hospitals in England, and again in such work in France for nearly two years, I do not remember having come across such a case, and my colleague, Colonel F. G. Finley, tells me that his experience has been the same over a similar period.

Nearly all soldiers who have been shot in the chest, and in whom the missiles are still retained, complain of some cough and shortness of breath and of some pain in the chest, but I cannot say that they complain any more than do those in whom the missile has passed through and through. Further, in the former case most men have unfortunately been told that the foreign body is still in the chest, and have even been shown the X ray plates, and the knowledge so acquired is bound to make them introspective and thus will retard their complete recovery.

The Question of Operation.

The question of the early removal of large pieces of, in all probability, septic foreign material is not one that can be discussed now, but I note with entire approval that Colonel Elliott thinks that such large pieces of shell and shrapnel casing in the lung should be disposed of at once, as they will almost certainly produce gross infection, with frequent severe hæmorrhage, if left alone; but with this exception it would seem well to be very chary about removing small foreign bodies, especially rifle bullets and shrapnel balls. These do not seem to do any harm if left alone, and in no way increase the gravity of the symptoms produced by other associated conditions, such as hæmothorax, pneumothorax, and actual lung lesions.

Colonel Elliott states that it would appear from recent French publications that the mortality is much higher in chest wounds than was at first supposed, and that this high mortality requires vigorous efforts on the part of the surgeons to save life. "Also, in respect of casualties who survive these wounds, evidence is brought forward to show that retained projectiles, and especially shell fragments, almost always cause trouble, either by the introduction of sepsis, or, if sterile, by the introduction of later pathological changes or symptoms that incapacitate the patient for service."

Hence it has been urged by several surgeons that all shell fragments, other than those of small size, should be removed within the first 24 hours, with a cleansing of the wound track, suture of the lung, and evacuation of blood-clot from the pleural cavity. With this rule there will probably not be much difference of opinion. But the same authors go on to advocate "the removal from the thorax of all other retained foreign bodies at a much later date when the possibility of septic complications has passed away." In my humble opinion no such routine operation is called for. There are exceptions, of course, as where such a foreign body is giving rise to active trouble. Thus, in Case 6 in our series the patient had a resection done for an empyema and a permanent sinus remained, which eventually was found to lead directly to a piece of shrapnel which lay in the lung surrounded by fibrosis. This was removed and all the acute symptoms disappeared and the sinus closed, and the patient was well on his way to recovery before he left for Canada.

Even if it should occur that these foreign bodies do commonly at a much later date produce distress, probably it would then be less risky to remove them than to do so earlier merely in anticipation of such possible trouble.

No.	Age	X ray.	Weeks before final disposal	Disposal.
1	—	Shows bullet (shrapnel) left chest at level of spine of scapula; many fragments also here.	25	C 3.
2	—	Shows pieces of shrapnel all over left side of chest.	—	Com. depôt.
3	—	Shows piece of shrapnel between 4th and 5th ribs rt. side. Piece of shrapnel upper 3rd right lung.	—	A 3.
4	—	Shows large piece shrapnel intrathoracic just on left diaphragm. Moves with respiration.	—	Com. depôt.
5	—	Shows shrapnel bullet in region of junction 11th and 12th rib and vertebra.	—	Duty.
6	22	2 pieces shrapnel, 1 large, 1 small, intrathoracic, left side, large piece just internal to 7th rib 9 cm. from vertebral border. Opacity left lower lobe. Fracture 9th rib.	—	Invalided to Canada.
7	27	Bullet lying intrathoracic left side just posterior to 5th interspace on diaphragm, point toward back. Marked opacity left base. Movement of diaphragm restricted.	—	Duty.
8	34	Shrapnel ball, intrathoracic, left side, lying on diaphragm, 5 cm. in from apex of heart. Marked opacity in rt. lung. Diaphragm higher than normal, with adhesions to lateral chest wall.	—	Com. depôt.
9	—	F.B. 4½ in. from spine at the same level, with a large abscess around it. Oct. 17th, chest opened and abscess drained. Small piece of bone removed from lung. Oct. 28th, patient died of hæmoptysis.	—	Died.
10	—	Shrapnel bullet left chest just opposite heart. No lung changes July 27th, 1917, D. 1.	11	D 1. Com. depôt.
11	—	Injury to rt. clavicle 2 in. from external end, some necrosis occurring. F.B. in lung.	16	D 1. Com. depôt.
12	—	F.B. in chest opposite 1st interspace, close to sternum. 11 cm. from back.	—	D 1. Com. depôt.
13	—	Rifle bullet in lung. Operated on. Died suddenly on 3rd day, apparently from pulmonary thrombosis.	—	Died.
14	18	Several small fragments of shell in right lung. Large hæmothorax, relieved by oxygen replacement.	20	Duty.
15	29	Shows large piece shrapnel intrathoracic, rt. side, level 3rd rib, 7 cm. right of mid. line. Marked infiltration rt. upper lobes and cavity here. *Tubercular bacilli in sputum.*	2	Invalided to Canada.
16	27	Shows small piece shrapnel lying 1·5 cm. internal to 10th rib, mid-axillary line, rt. side. 2 small pieces just external to 9th rib, 2 cm. from vertebral border, lt. side. 1 small piece just internal to 8th rib, 2 cm. from vertebral border, rt. side.	15	Com. depôt.
17	31	Shows shrapnel ball intrathoracic 2 cm. in front of the 6th interspace, just to right of spine; no lung involvement.	9	Light duty.
18	39	Shows shrapnel ball intrathoracic lying 2 cm anterior to 8th interspace near spinal column, lt. side. Multiple fine shrapnel at site of fracture of 8th rib.	15	Invalided to Canada.
19	24	Shows medium-sized piece shrapnel intrathoracic just above diaphragm near apex of heart, about 4 cm. anterior to 10th rib posteriorly. Old fracture 8th and 9th ribs.	15	Permanent base duty.
20	29	Shows large piece shrapnel near diaphragm opposite 10th vertebra, left side.	70	Invalided to Canada.
21	23	Shows large piece and several small pieces shrapnel intrathoracic, left side, posterior, level 6th rib, moves with respiration. Also large and multiple shrapnel intrathoracic rt. side posterior level of 4th rib.	31	Light duty.
22	20	Shows medium sized piece shrapnel between 9th and 10th ribs, 2 cm. to left of spinal column.	33	,,
23	23	Shows F.B. in diaphragm in front of 10th dorsal vertebra, near rt. border, just below heart.	54	,,
24	19	Shows large piece shrapnel just internal to 5th interspace, nipple line, rt. side.	13	Com. depôt.
25	32	Shows shrapnel ball intrathoracic left side, 6 cm. deep, level of 10th intercostal space. 3 cm. from vertebral margin. Fibrosis and opacity here.	13	Invalided to Canada.
26	18	Shows large piece shrapnel intrathoracic left side, 3 cm. from mid-axillary line, level 7th rib posteriorly.	30	,,
27	32	Shows medium-sized piece shrapnel intrathoracic close to articulation of 7th right rib.	42	Canada.
28	—	Shows piece of shrapnel between 5th and 6th ribs on left side, 3 in. from sternum. Developed empyema. Chest opened and drained.	—	Duty.
29	—	Shows F.B. 1 cm. by ¾ cm. lying in rt. chest 2½ in. from spine and 4·3 in. from sternum.	—	,,
30	—	Shows shrapnel ball just inside left lateral chest.	—	,,
31	—	Shows shrapnel at level of angle of scapula. Pleura drained.	—	,,
32	—	Shows small piece shrapnel over 9th rib. Wound enlarged and rt. chest drained. F.B not removed.	12	Invalided to Australia.
33	—	Shows rifle bullet rt. chest at junction of 11th rib and vertebra.	—	Duty.
34	—	Shows F.B. left side behind lower end of sternum.	25	,,
35	—	Empyema developed. Chest opened and drained. X ray shows F B in chest opposite 7th dorsal vertebra.	30	Invalided to Canada.
36	—	Shows bullet in centre of lower half of left chest with fibrosis around it.	11	C 3.
37	—	Shows F.B. ¾ in. × ½ in. right chest 4¼ in. from ant. chest wall. No hæmothorax. Paralysed arm from injury.	15	Canada.
38	—	Shows bit of explosive bullet ¾ in. × ½ in. in right lung behind 3rd rib.	16	Com. depôt.
39	—	Shows piece of shrapnel ¾ in. × ½ in. in right chest behind 2nd rib. Wound of entrance over middle of rt. scapula.	17	,,
40	—	Foreign body present.	29	,,
41	—	,, ,,	8	,,
42	—	,, ,,	9	,,
43	—	,, ,,	11	,,
44	—	,, ,,	8	,,
45	—	,, ,,	9	Invalided, perm. unfit.
46	—	,, ,,	16	Com. depôt.
47	—	,, ,,	8	,,
48	—	,, ,,	12	,,
49	—	,, ,,	52	,,
50	38	Several small pieces of shell in rt. lung, empyema and resection.	18	Invalided to Canada.

Conclusions.

1. Evidence is lacking that small fragments of shell and shrapnel and likewise rifle bullets and shrapnel balls retained in the lung commonly give rise to any serious trouble.

2. The mortality of gunshot wounds of the chest in patients that have survived the early days of their invalidism and been sent to England with retained missiles in the chest is practically nil if these foreign bodies be left alone.

3. Hence, when it has not been considered necessary by the surgeons at the Front to operate immediately, it should not later on be done, unless, indeed, some very definite indication, such as an abscess, exists.

ABNORMAL MEDIAN AND ULNAR NERVE-SUPPLY IN THE HAND.

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DURING the last six months I have met with four cases of abnormal nerve-supply to the hand, two of the sensory distribution and two motor. In two cases the first and second dorsal interossei were quite unaffected in severe ulnar nerve lesions from gunshot wounds, indicating their supply to be from the median nerve in these cases, while the other two cases illustrated an abnormally large sensory supply by the ulnar to the inner two and a half fingers instead of the usual one and a half.

In one of these latter, Captain J. A., aged 34, a case of median-nerve injury from a shell wound in the upper arm, in which the brachial artery was also severely injured, there was the usual wasting of the flexors and of the thenar eminence, with reaction of degeneration of these muscles, but the anæsthesia was limited to the palmar surface of the thumb, the index, and the outer half of the middle finger, both on palmar and dorsal aspects, no trace of anæsthesia being present on the inner half of the middle finger, though the injury was sufficiently severe to abolish sensation completely to prick and to firm pressure on the two distal

phalanges of the index and on the palmar surface of the thumb. It is, of course, well known that the ulnar nerve sometimes supplies sensation to the dorsum of the inner side of the proximal phalanx of the middle finger, but in the case here described the ulnar supply was much larger, a whole finger more than usual.

The complement to this case I have seen recently in a youth of 22, a private, with a severe injury of the ulnar nerve from a shrapnel wound through the inner side of the upper forearm. There was complete wasting of all the interossei and hypothenar muscles, though the flexor carpi ulnaris had escaped. There was total anæsthesia to pin-prick and even to the hardest squeeze on the whole of the little and ring fingers and inner side of the hand, and dense anæsthesia also to pin-prick and to moderate pressure over the inner half of the middle finger, both on palmar and dorsal aspects, only hard pressure being perceived in some spots, though sensation was quite normal on the outer side of the middle finger (see figure). Indeed, this anæsthesia of the inner half of the middle finger was much more dense than is usually met with over the inner half of the ring finger in total lesions of the ulnar nerve, in which pin-prick is usually perceived at once as pressure over this half of the finger.

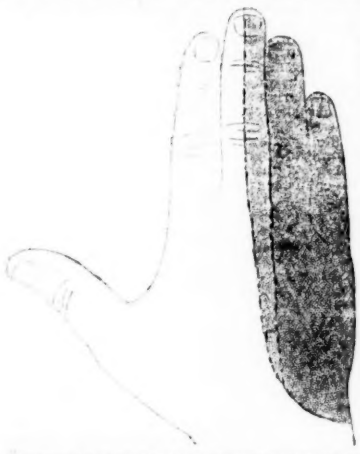

Diagram showing abnormally large area of ulnar anæsthesia on the dorsum of the hand: total to all forms on little and ring fingers and nearly complete, even to pressure, on inner half of middle finger.

Both these cases point to a larger area of ulnar nerve sensory supply at the expense of the median. These two cases are, of course, open to the criticism that in the first case the sensory nerve fibres supplying the third digital cleft may have been uninjured, and that in the second case these particular fibres of the median may have been damaged in addition to the ulnar nerve. That this was most unlikely in the second case is proved by the complete escape of the remainder of the median supply, both sensory and motor, which were normal to all tests. Moreover, the probability of the sensory supply of these two nerves being abnormal in these two cases is increased considerably by the fact that I have been able to prove in another case by operation that total division of the ulnar nerve in no way affected the first or second dorsal interossei muscles, thus showing incontestably an abnormally small motor distribution of the ulnar nerve in the hand.

In two patients I have seen complete escape of the first and second dorsal interossei in severe lesions of the ulnar nerve, the third and fourth dorsal interossei being paralysed with the hypothenar muscles and showing complete reaction of degeneration to electrical testing. The sensory paralysis in these two cases was of the usual distribution.

In one of them, Private N., an Australian, aged 23, the nerve was operated upon and found to be very much damaged, one inch of the nerve being then excised and the nerve sutured. When I was able to examine him again 21 days later there was still perfect voluntary movement of the first and second dorsal interossei, as he could abduct easily the index and middle fingers, though he could not move the middle finger towards the ring finger beyond the middle line. There was no sign of wasting of the two outer dorsal interossei, and both reacted briskly to faradism, just as they did before the operation upon the nerve.

Oppenheimer[1] mentions a case of ulnar paralysis in which all the interossei and lumbricals escaped, and Goldmann[2] describes a case of section of the ulnar nerve in which there was no motor disorder whatever. I have, however, met with no record of a case in which the dorsal interossei, like the lumbricals, were divided equally between the median and ulnar nerves, and I have therefore thought it advisable to record these cases.

[1] Oppenheimer: Text-book of Nervous Diseases. Trans. by Alex. Bruce. 1911, i., 455. [2] Goldmann: Beitr. z. kl. Chir., ii.

CEREBRO-SPINAL FEVER: THE MODE OF INVASION BY THE MENINGOCOCCUS.

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IT is now generally accepted that the naso-pharynx is the portal of entry of the meningococcus in cases of cerebro-spinal fever. There is still, however, much difference of opinion as regards the exact mode of invasion of the meninges from this primary situation.

The possible routes of entry to the meninges are as follows:—1. Direct extension, *via* (*a*) middle ear; (*b*) sphenoidal sinus; (*c*) trans-ethmoidal route. 2. Indirect route, *via* the blood stream.

Direct Extension.

(*a*) *Middle ear.*—Infection occurring from the naso-pharynx by spreading down the Eustachian tube to the middle ear, and thence along the pia-arachnoidal sheath of the auditory nerve, has been suggested; this view, however, has no evidence in its support. Acute otitis media is most infrequent in cerebro-spinal fever, and, in the rare cases in which it does occur, always appears late in the disease. Recent otitis media was not present in upwards of 100 cases under our care, although four had chronic otitis media of very old standing.

(*b*) *Sphenoidal sinus.*—Investigations by Westenhoffer,[1] von Lingelsheim,[2] and E. Meyer suggested that infection might occur by direct extension from the naso-pharynx to the sphenoidal sinus; from here suppuration would readily extend through the thin lamina of bone above the sinus. Westenhoffer found that in 29 autopsies 34 per cent. showed some inflammation of the sphenoidal sinus; additional support for this hypothesis was thought to be forthcoming by the fact that in cases that died early in the disease the exudate was found localised in the base of the region of the hypophysis. A similar localisation, however, is observed in practically all forms of early meningitis—e.g., tuberculous meningitis and that secondary to middle-ear disease, &c. Flexner also showed that there was an identical localisation in the experimental meningitis induced in monkeys by the intra-spinal injection of meningococcus culture.

Westenhoffer's later observations led him to abandon his former view, as further researches failed to demonstrate the meningococcus in the sphenoid bone itself and showed that the exudate was confined to the superior and lateral aspects of the bone. Direct extension *via* the sphenoidal sinus has, more recently, again been advocated by Embleton and Peters,[3] who met with five cases of cerebro-spinal fever in which, on post-mortem examination, the sphenoidal mucous membrane was found injected and the sinus cavity filled with pus, together with osteitis of the surrounding bone. In two cases meningococci were demonstrated in the pus cells contained both in the sphenoidal sinus and the bone and in one the cancellous tissue also; the organism was not found in the other three. These authors also mention a recrudescent case of cerebro-spinal fever in which the sphenoidal sinus was opened from the nose, a drachm of pus escaping, which on examination was found to contain meningococci.

Although such direct infection by the meningococcus may possibly occur in very rare instances, just as in pneumococcal or streptococcal meningitis secondary to foci in the nasal fossæ, it is certainly not the usual mode of meningeal infection in cerebro-spinal fever. Further, in view of Westenhoffer's later observations, one has to bear in mind the possibility of such sphenoidal conditions being secondary to the meningitis rather than occupying a causal relationship to it. In 25 autopsies we found no evidence to support this view of infection *via* the sphenoidal sinus.

(*c*) *Trans-ethmoidal route.*—By experimental injections of methylene blue and Chinese ink in the dog and rabbit, André[4] demonstrated downward prolongations of the sub-arachnoid space, which form a network round the olfactory filaments as they pass through the cribriform plate. Other prolongations also pass, though quite independently of the

olfactory nerves, and, further, after injection, the mucous membrane of the nose was coloured as far downwards as the level of the superior turbinate bone. He concluded, therefore, that by means of these prolongations a direct communication exists between the subarachnoid space and the lymphatics of the upper portion of the nose. The direction of the current, however, demonstrated by these injections is from the subarachnoid space to the nasal lymphatics; meningococci similarly injected in monkeys found their way into the naso-pharynx.

As a result of the above observations, Netter and Debré [5] favoured the view that in cases of cerebro-spinal fever direct infection occurred from the naso-pharynx through the subarachnoid prolongations. It was necessary, however, to imagine, in cerebro-spinal fever, a reversal of the direction of the current—that is, from the naso-pharynx to the subarachnoid space, instead of *vice versa*. Of this no definite proof exists, experimental or pathological; infection of the meninges in monkeys has not been provoked by inoculation of meningococci into the naso-pharynx, although it is not without interest in this connexion to note that Flexner produced poliomyelitis in monkeys by the intra-nasal injection of the virus. Westenhoffer in his fatal cases found no evidence of extension along the lymphatics about the carotid artery nor along the nerve sheaths.

This view, therefore, although not without attraction, is somewhat conjectural and lacks proof; clinical observations, moreover, as we shall mention later, do not lend it much support.

Infection via *the Blood Stream.*

According to this view the meningococcus is absorbed from the naso-pharynx and carried by the blood to its site of election—the pia-arachnoid. The fact of obtaining cultures of meningococci from the blood of cerebro-spinal fever patients, once definite meningeal inflammation has begun, is not, of course, evidence that infection has taken place *via* the blood stream; such coccæmia might well have developed secondarily to the meningitis by the escape of the organisms into the circulation from the pia-arachnoid space, as occurs at the height of meningitis induced in monkeys by the intrathecal injection of meningococci. A similar possibility applies to the indirect evidence of the presence of cocci in the blood stream, afforded by the appearance of lesions distant from the central nervous system—e.g., arthropathies.

The most significant evidence lies in the occurrence of cases of cerebro-spinal fever in which the meningococcus can be isolated from the blood at a time prior to the invasion of the meninges, when meningitis can be proved, by examination of the cerebro-spinal fluid, to be non-existent. It would appear that, in the vast majority of cases, the meningococcus on reaching the blood stream from the naso-pharynx is quickly carried to the meninges (in from a few to 48 hours), constituting at this stage a coccæmia or temporary presence of meningococci in the circulation, whilst being carried to their destination, rather than a definite septicæmia in which the organisms are multiplying in the blood stream. Some recent experiments by Cresswell Shearer and Warren Crowe [6] suggest that conveyance of the meningococcus from the naso-pharynx to the meninges may be performed by the leucocytes. These observers, using freshly drawn spinal fluid from cerebro-spinal fever patients, in which the leucocytes had been shown to be alive by trypan-blue staining and observation on the warm stage, obtained good evidence that the meningococci could be taken up by human leucocytes in large numbers and retained by them for some considerable time without undergoing digestion; they could be recovered from these leucocytes up to 48 and even 60 hours afterwards.

It is true that experimental blood inoculation in animals has failed to produce meningitis, but the explanation of this failure may lie in the fact that all laboratory animals, as regards specific lesions, are relatively insusceptible to the meningococcus; in monkeys even, Flexner had to inject meningococci directly into the subarachnoid space in order to induce meningitis.

In some cases of cerebro-spinal fever the organism may infect the blood, causing a true septicæmia, and in rare instances remain confined to the blood stream for a considerable time before the meninges become involved. If the meningococcus were not primarily absorbed into the circulation it is difficult to understand how this could possibly occur. The following case, which recently came under our care, illustrates the meningococcus definitely established in the blood stream prior to infecting the meninges.

Meningococcal Septicæmia preceding the Meningitis.

CASE 1.—The patient, a man aged 26, was admitted to hospital in a collapsed state. He had felt quite well during the previous day, but in the evening complained of headache. That night he slept very little, and next morning had several shivering attacks vomiting about midday. On admission to hospital during the afternoon he was very pale; the temperature was 103·8° F. and the pulse feeble, the rate being 120 per minute. Beyond this there were no physical signs.

Early next morning the patient was seen to be more collapsed and a *hæmorrhagic rash*, consisting of many petechiæ and several large purpuric spots and even patches (vibices), was found to have appeared. The vibices were most numerous on and around the hips, but were also present on the arms and legs (extensor aspects), abdomen, and a few on the face. The temperature was subnormal (96·8°) and the pulse too feeble to count. His mental condition was normal, the sphincters were unaffected, the neck was perfectly supple, and Kernig's sign was definitely negative. He had now ceased to complain of headache. Lumbar puncture revealed a perfectly clear cerebro-spinal fluid; no increase was found in the cellular constituents and no organisms, either on direct examination of the centrifugalised deposit or in culture. His appearance strongly suggested that of a fulminating case of cerebro-spinal fever, in spite of the normal consciousness and complete absence of all signs of meningitis. Consequently 30 c.c. of antimeningococcic serum were given intramuscularly and, to keep the blood pressure as high as possible, rectal saline (six-hourly) and digitalin (gr. 1/100, four-hourly) were also administered.

A blood culture taken at this time yielded a Gram-negative diplococcus, showing the cultural and fermentative characteristics of the meningococcus and, further, agglutinating by Gordon's type 2 univalent serum. A leucocyte count, performed the same morning, showed 38,400 white cells per c.mm. of blood. Blood films, taken from the ear and from a purpuric patch, did not show any characteristic diplococci. Naso pharyngeal swab yielded a meningococcus agglutinated by the same serum as that from the blood (type 2, Gordon).

Meningitis.—By the evening of the same day the patient's general condition had somewhat improved; the pulse was stronger, the rate now being 88 per minute, and the temperature had risen to normal. There was now some slight rigidity of the posterior cervical muscles, and Kernig's sign appeared just positive; the mental condition and sphincters, however, remained normal. Lumbar puncture now yielded 45 c.c. of slightly turbid fluid, which on microscopical examination showed polymorphonuclear cells and a moderate number of lymphocytes; several pairs of Gram-negative diplococci were also present, both intra- and extra-cellularly. He was given 30 c.c. of anti-meningococcic serum intrathecally.

On the following day the patient's general condition had still further improved, although neck rigidity and Kernig's sign were more marked. The cerebro-spinal fluid, though still remaining turbid and with the same cytological characteristics, showed no Gram-negative diplococci. The leucocytes had fallen to 24,000 per c.mm. Serum was administered intrathecally daily until the fifth day of illness, lumbar puncture being continued until the sixth day, when the cerebro-spinal fluid was quite clear and showed no abnormal increase in the number of cells.

It would appear that the above case, in the usual course of events, should have been of a "fulminating" type, but the patient came under observation very early in the disease and, also, the septicæmic stage was somewhat prolonged, thus enabling therapeutic measures to be taken prior to the involvement of the meninges. From the preceding remarks, it follows that fulminating types probably result from a severe blood infection. Blood cultures, therefore, should be positive, and this is often found to be the case. Some observers, indeed, have seen Gram-negative diplococci in blood-films from patients exhibiting a purpuric eruption. A. C. Coles [7] figures such films taken from the ear of a patient with a purpuric rash who died within 50 hours of the onset of the disease. In these cases the meningitis, as shown by post-mortem examination, is often comparatively slight.

Other examples of meningococcal infection occasionally occur in which the meningococcus remains confined to the blood stream and never settles in the meninges. Such cases are admittedly rare.

In 1906 Andrewes reported a case with a purpuric eruption which yielded meningococci upon blood culture. The patient died in a few days without developing meningitis, evidence of which was also absent at the post-mortem examination. More recently Pybus [9] has recorded the case of a girl, aged 3 years, exhibiting petechiæ and some small hæmorrhagic patches on the lower extremities, who died within 12 hours of an acute onset. Post-mortem cultures made from the heart blood yielded a pure growth of meningococci, but the brain and spinal cord presented no sign of meningitis.

It is possible, of course, that if the above patients had not succumbed to the intensity of the blood infection, the meninges might have become involved later. In a few septicæmic cases, however, structures other than the meninges may be involved, as, for instance, the endocardium.

The following case of meningococcal septicæmia with ulcerative endocarditis recently under our observation ran a

course of over six weeks' duration. No physical signs of meningeal infection were present at any stage of the disease, and also at the autopsy meningitis was found to be absent.

Meningococcal Septicæmia with Ulcerative Endocarditis.

CASE 2.—The patient, a man, aged 37, was received into hospital, the temperature being 104·2° F., with a provisional diagnosis of influenza. He was said to have had "rheumatic fever" when young, but to his knowledge had had no other illnesses. On admission, no definite physical signs were apparent, and after five days the temperature fell to normal, the patient being allowed up a day or two later. The pulse-rate at this time varied between 84 and 90 per minute; during the pyrexial period it had averaged 106. When he had been up about six days the patient was suddenly seized with rigors; the temperature rose to 100°, and from this time he complained of dyspnœa and frequent palpitation.

General course.—The pyrexia occupied six days before reaching its maximum (103·4°), having gradually risen from 100° by successively increasing evening rises, the morning remissions being 1–2° lower. From this point onwards the pyrexia was rather of a continued type, varying between 100° and 103·4° during the second week, but not falling below 101°, except ing on one occasion, during the course of the third, fourth, and fifth weeks; the morning temperature was usually about 1° lower than that in the evening. Throughout these periods, the patient complained of more or less constant dyspnœa, occasionally showing exacerbations in its severity. During the fourth and fifth weeks he was somewhat cyanosed, and the tongue was dry and tremulous. Towards the end of the sixth week his condition became increasingly grave and œdema of the lower extremities made its appearance. The temperature began to fall and did not rise above 99·4° during the four days preceding his death, which occurred after a course of six and a half weeks.

No rash or petechiæ ever appeared, nor was there any evidence of meningitis; both neck rigidity and Kernig's sign were absent throughout, and the mental condition, excepting when he sank into unconsciousness before death, was invariably normal.

Circulatory system.—Heart: During the first three weeks of the illness a "to-and-fro" murmur could be heard at the base of the heart in the aortic region, together with a very faint systolic murmur at the apex. The heart became moderately enlarged, the apex beat reaching just outside the nipple line in the fifth interspace. By the end of the fifth week, however, the enlargement was considerable; the apex extended in the sixth interspace fully ½ inches beyond the nipple line. In the aortic area there was a marked double murmur, which varied in intensity from time to time; the apical systolic murmur also became more pronounced. During the last week of the course the cardiac beats were indistinct and the murmurs occasionally inaudible.

Pulse: The pulse-rate did not reach above 90 per minute during the first week; up till the end of the third week its highest recorded rate was 104, the average for this period being about 100. Thereafter, however, it seldom fell below 112, and was frequently 136, especially during the fifth week. With the decline of the pyrexia, the pulse-rate also showed a tendency to fall, rising again, nevertheless, towards death.

Blood: A count of the white blood cells, midway through the second week, showed only 6200 per c.mm. At the same time the patient's serum failed to agglutinate paratyphoid A. B, or typhoid bacilli; a Wassermann reaction also was negative. Blood culture (10 c.c. of blood in broth), however, yielded a Gram-negative diplococcus, showing the cultural characteristics and fermentative reactions of the meningococcus; it fermented glucose and maltose, but not saccharose. The organism, moreover, gave a positive agglutination reaction with Gordon's Type 2 univalent meningococcal serum, but not with that of the other three types.

Early in the fourth week the leucocytes had increased to 39,400 per c.mm. and, to confirm the previous findings, another blood culture was taken with the same result as before—the isolation of a Type 2 meningococcus.

Other viscera: At the beginning of the fourth week the spleen appeared to be tender, but although enlarged to percussion during the sixth week its edge was never definitely palpable. The liver was found to be enlarged as early as the third week, the lower edge extending about 1–1½ in. below the costal margin. The lungs always appeared clear, but a scanty mucoid expectoration occurred throughout. The urine, whenever examined, contained a trace of albumin.

Autopsy.—Brain: Pale and anæmic, but otherwise normal. No meningitis.

Heart: The heart was large and soft, being 18½ oz. in weight. The cardiac muscle generally, and particularly that of the ventricles, showed well-marked myocarditis (musculature mottled, small pale areas alternating with congested areas, and the muscle fibres showing a tendency to fall apart). The acute and widespread nature of the myocarditis was confirmed later on microscopical examination of prepared sections. On the surface of the heart there was considerable thickening of the epicardium ("milk-spots"), covering the greater part of the posterior aspect of the right ventricle, the whole of the right auricle, and on the left ventricle, chiefly following the course of the vessels. The right auricle and both the ventricles were markedly dilated, but the capacity of the left auricle was only slightly increased; both the right auricle and the right ventricle showed considerable hypertrophy, and the left ventricle a moderate amount. The coronary arteries, pulmonary artery and valves appeared normal; the tricuspid valve was healthy, but the orifice slightly dilated. The mitral orifice was also dilated, admitting three fingers, while the valves were free and normal, excepting at the extreme base of the anterior cusp, the appearance of which is described below.

The aortic valve showed ulcerative endocarditis affecting the left posterior cusp only, the other cusps appearing normal. A portion of the left half only of the left posterior cusp was involved; the free edge was quite unaffected, but below this, between the edge and the base, was a large perforation, more or less circular in shape, and about ⅜ inch in diameter. The lower edge of the opening reached to the base of the cusp, the margins were ulcerated, and projecting from it into the ventricle was a massive fibrinous and fairly tough vegetation; the latter structure was about ½ inch thick and projected a distance of ½ inch from the cusp. Sections prepared from this vegetation, including the piece of aortic cusp to which it was attached, showed large numbers of cocci having the morphological appearance and staining reactions of the meningococcus. Other vegetations apparent at the edge of the perforation encroached to a slight extent on the base of the anterior mitral cusp where it and the aortic cusp meet.

Aorta: A small circular aneurysm, ¼ inch in diameter, was seen immediately above the perforation in the cusp; it perforated the inner and middle layers of the aorta, its base being formed by the external coat. A few fatty streaks were found in the tunica intima, but no atheroma or evidence of syphilis.

Lungs: The right lung showed old pleural adhesions of the outer and posterior surfaces of the upper lobe and also of the posterior surface of the lower lobe in its upper portion. There were no adhesions on the left side nor to the diaphragm. A certain amount of chronic bronchitis and emphysema was also apparent.

Liver: Much enlarged, the weight being 90½ ounces; there was nothing visible to the naked eye.

Spleen: Also enlarged (weight 18 ounces); it showed old adhesions; the pulp was soft and friable, and a few recent infarcts were present.

Kidneys: Both enlarged generally, but no other apparent change.

R. L. Cecil and W. B. Soper,[10] in 1911, reported a somewhat similar case of primary meningococcal endocarditis, proved by blood culture and autopsy, who died on the tenth day of illness without developing meningitis. Some doubt has been thrown upon Cecil and Soper's case by later writers on the ground of the difficulty in distinguishing the meningococcus from the gonococcus in blood cultures. We consider, however, that the case described above confirms their report.

Further evidence of infection *via* the blood stream is afforded by clinical observations gained by a study of the onset of the disease in different cases. The onset, although sometimes preceded by a variable period of slight malaise, is usually somewhat sudden, in contrast, as pointed out by Elser and Huntoon, to that form of meningitis secondary to otitis media, in which infection of the meninges occurs by direct extension. In the majority of cases of cerebro-spinal fever initial rigors are present, frequent chills, and, finally, vomiting. Cases coming under observation at this stage may reveal a perfectly clear cerebro-spinal fluid, showing no increase in the cellular constituents and devoid even of diplococci.

Dopter originally conceived cerebro-spinal fever as a disease falling into three definite stages: (1) catarrhal; (2) septicæmic; and (3) meningeal. This view was also, in 1915, advocated by Lundie, Thomas, and Fleming[11] in England, and later by Fairley and Stewart[12] in Australia. They regarded the catarrhal stage as the most prevalent form of the disease, the meningeal stage being reached in a comparatively small percentage of cases. As Horder[13] remarks, this view comprises the whole series of pathogenic events open to the meningococcus rather than connotes the disease process to which it more often gives rise. In man, for whom the meningococcus is definitely pathogenic, there is overwhelming evidence that the meninges are pre-eminently the site of election for this organism.

Lundie, Thomas, and Fleming categorically stated that all their carriers had naso-pharyngeal catarrh, but the fact of such catarrh being present in all carriers has not been borne out by other observers. The greater number of carriers that we have dealt with during the past two years have shown no naso-pharyngeal catarrh, and in the remainder evidence that it was due to the meningococcus was very indefinite. In some, indeed, it may be accounted for by the presence of adenoids, which, as Foster and Gaskell[14] point out, is by no means an uncommon concomitant of the carrier state.

Westenhoffer and von Lingelsheim considered that a meningococcal pharyngitis occurred before the supervention of meningitis. It is true that some cases show a varying degree of pharyngitis or other catarrhal condition; a fair percentage, also, complain of catarrhal symptoms, such as "sore throat," "cold" or cough, preceding the onset of cerebro-spinal fever. Many cases, however, have no catarrh. Nevertheless, it is probable that naso-pharyngitis and other catarrhal conditions predispose to the entry of the meningococcus rather than result from its presence in the respiratory tract. The occurrence of cerebro-spinal fever during convalescence from such catarrhal states as influenza and measles further supports this view.

It was possible to obtain a detailed history of the onset in 62 of our cases; in 25 (40 per cent.) the attack of cerebro-spinal fever was immediately preceded by some catarrhal condition. It consisted of a complaint of "sore throat" in 11 patients of the 25; in five of these the "sore throat" was accompanied by a "cold" and in three a cough. The duration of such symptoms was from 3 to 12 days. 12 patients complained of a "cold" prior to the onset of cerebro-spinal fever, the period varying from three days to

three weeks, and, finally, a cough had been present in two patients for three weeks preceding the illness. One patient developed cerebro-spinal fever within four days of his recovery from a mild attack of influenza and another during convalescence from measles.

Conclusions.

1. The mode of entry of the meningococcus is *via* the blood stream.

2. In the ordinary type of case the coccus is carried to the meninges by the blood within a few hours without definitely infecting the blood itself.

3. In some cases, however, blood infection (septicæmia) occurs—e.g., in fulminating cases prior to the involvement of the meninges; the septicæmia then frequently overshadows the meningitis.

4. In rare cases the organism may remain infecting the blood alone for a considerable time, before finally reaching the meninges, or the patient may die of such septicæmia before meningitis can occur.

5. In other instances the meningococcus infecting the blood may also invade structures other than the meninges—e.g., the cardiac valves.

6. Catarrhal conditions predispose to meningococcal infection, but the meningococcus does not necessarily produce naso-pharyngeal catarrh.

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ON THE ACTION OF SPINAL FLUID IN STIMULATING THE GROWTH OF THE MENINGOCOCCUS.

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IN a former paper[1] I have shown that the growth of the meningococcus on an artificial culture medium is considerably increased in the presence of an aqueous or an alcoholic extract of dilute nasal secretion, this secretion, like blood, acting as an accessory food-body in stimulating bacterial growth. The power which the meningococcus possesses of invading the cavities and membranes of the brain and spinal cord renders it important to determine if brain tissue extracts or normal human spinal fluid exercise any similar action on the growth of this germ.

The following experiments have been devised with the object of testing this point. The ones dealing with the action of spinal fluid have been repeated many times.

EXPERIMENT 1.—*To determine the action of small pieces of brain tissue and spinal cord membranes in stimulating the growth of the meningococcus when added in a sterile and thoroughly washed condition to various media.*—(*a*) To the surface of a culture plate of sterile silica jelly a thin emulsion of human spinal cord and brain membranes was applied. This was prepared by washing the tissues first thoroughly in running distilled water and then grinding them up with sand and sterilising. No growth of the meningococcus could be obtained on these plates.

(*b*) The experiment was varied by adding the emulsion to a 2 per cent. agar solution, mixing, and rendering neutral to litmus paper and sloping it in test-tubes. No growth could be obtained on these tubes using freshly isolated strains of the meningococcus. Growth, however, took place when old laboratory strains were used.

(*c*) Small fragments of similarly prepared brain tissue and membranes were added to agar slopes and sterilised. No growth took place on these tubes when they were inoculated with freshly isolated strains of the meningococcus.

The conclusion drawn from these experiments is that if human spinal cord tissue, brain membranes or tissue are thoroughly washed to remove all traces of blood and serum, then these tissues in themselves possess no particular power of stimulating the growth of the meningococcus. The experiments as carried out as described above are inconclusive, as it is difficult to accurately adjust the reaction of these media.

EXPERIMENT 2.—*To determine the action of sterile human spinal fluid in stimulating the growth of the meningococcus when added in different proportions to various standard culture media.*—(*a*) To the surface of a culture dish of Crowe's chocolate medium, 25 c.mm. of an emulsion (of 4 million cocci to the c.c.) of a freshly isolated meningococcus strain in sterile human spinal fluid was added. A control emulsion of the same strain was made up of the same strength in sterile Ringer's solution. The growth on the plate containing the spinal fluid emulsion was many times greater than that obtained on the plate inoculated with the Ringer's solution after 48 hours' incubation at 37° C.

(*b*) To 10 c.c. of a 2 per cent. solution of agar in Cole and Onslow's[2] amino-acid broth 2 c.c. of sterile human spinal fluid was added, while to a control tube 10 c.c. of the same agar solution without the spinal fluid was made up. Both tubes were then inoculated with a similar quantity of a freshly isolated meningococcus strain. A large and thick growth took place on that tube which had received the spinal fluid, while little or no growth took place on the tube without it.

(*c*) To a tube of 10 c.c. legumen trypagar 2 c.c. of sterile human spinal fluid was added and the tube inoculated with a freshly isolated strain of the meningococcus. A control tube without spinal fluid was inoculated with a similar quantity of the same culture. A large amount of growth was obtained after 24 hours' incubation at 37° C. on the tube which had received the spinal fluid, while no growth had taken place on the tube without it.

The conclusion drawn from these experiments was that the growth of the meningococcus is greatly increased on various solid media in the presence of normal sterile human spinal fluid as compared with the growth of the same strains of the germ grown on these media in its absence.

EXPERIMENT 3.—*To determine the action of spinal fluid in stimulating the growth of the meningococcus, as compared with the action of fresh sterile blood and an aqueous extract of nasal secretion and an alcoholic extract of the same.*—To tubes A, B, C, D, and E 10 c.c. of Cole and Onslow's amino-acid broth was added. To tube B ten drops of normal sterile human spinal fluid was added. To tube C ten drops of sterile aqueous extract of nasal secretion was added. To tube D ten drops of a sterile alcoholic extract of nasal secretion was added. To tube E three drops of freshly drawn human blood was added. All the tubes were then sterilised for two hours in the steam steriliser. To each of the tubes was then added three drops of an (200 million cocci to the c.c.) emulsion of a freshly isolated strain of the meningococcus, a 24-hour culture being employed. The tubes were then incubated at 37° C. for 24 hours.

Result: A, no growth; B, large growth; C, small growth; D, little or no growth; E, large growth.

The conclusion drawn from this experiment was that both sterile human spinal fluid and blood increase the growth of the meningococcus in amino-acid broth, while this broth is alone unable to grow a freshly isolated strain of this germ. Spinal fluid in these experiments brought about a larger amount of growth in amino-acid broth than the same quantity of blood. An aqueous extract of nasal secretion produced slight growth, while an alcoholic extract brought about hardly any growth of the meningococcus in amino-acid broth.

EXPERIMENT 4.—*This experiment was in large part a repetition of the last one, the amino-acid broth in this instance being added to 10 c.c. plain agar and sterilised.*—Into three tubes, A, B, C, 10 c.c. of plain 2 per cent. agar solution was placed. In addition into tube A 2 c.c. Cole and Onslow's strong amino-acid broth was added. Into tube B 2 c.c. of boiled human spinal fluid was added in addition to 2 c.c. of amino-acid broth. Into tube C 2 c.c. of an aqueous extract of nasal secretion was added in addition to 2 c.c. amino-acid broth. The tubes were then sterilised by autoclaving for ten minutes at 120° C. They were then poured into sterile Petri dishes and allowed to set. To the surface of each dish 1 c.c. of an (200 million to the c.c.) emulsion of a 24-hour culture of a recently isolated meningococcus strain was added and spread over the surface. The plates were incubated for 24 hours at 37° C. No growth took place on plates A and C, but a thick growth appeared on plate D, this being the plate that had received the spinal fluid.

[1] THE LANCET, 1917, i., 59.

[2] Cole and Onslow: THE LANCET, 1916, ii., 9.

The conclusion drawn from this experiment is similar to that of the last in its main result; spinal fluid brings about a much larger growth of the meningococcus when it is present in a culture medium of agar and amino-acid broth than does nasal secretion extract.

General summary of the foregoing experiments.—The main outcome of the foregoing experiments is to show that there is present in normal spinal fluid some substance that greatly increases the rate of growth of the meningococcus on an artificial culture medium. They clearly demonstrate that this power, in the case of human spinal fluid, is relatively greater than that shown by blood or nasal secretion; that volume for volume spinal fluid brings about a much thicker growth of the meningococcus than do the same volumes of blood or nasal secretion.

In a recent paper Miss Jordan Lloyd[3] has drawn attention to the presence in widely different bodies as blood, serum, milk, and other animal and probably vegetable tissues, of certain accessory food factors which materially affect the rate of growth of the meningococcus on various media. It was to be expected therefore that a similar property would be possessed by the spinal fluid. The interest of the above experiments, however, lies not so much in the possession of this property, as in the fact that it is possessed in a relatively greater degree than either blood or nasal secretion, and that this fact may be of some importance in explaining the quick growth of the meningococcus in the cerebro-spinal fluid and its power of rapidly invading the membranes and cavities of the central nervous system.

In a recent paper I have shown[4] (in conjunction with Crowe) that human leucocytes are capable of taking up living meningococci and keeping them alive for considerable periods of time. We suggested that this might be the means by which this organism gains admission to the cerebro-spinal fluid and the meninges. In the light of the above experiments the rapid growth of the cocci would be ensured by the spinal fluid, once the organism had been introduced into it by the leucocytes. The present experiments with spinal fluid therefore afford some additional support of our original experiments as to the mode of infection in cerebro-spinal fever.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

REMOVAL OF SHRAPNEL FROM THE SUBCLAVIAN ARTERY.

BY H. C. DONALD, M.B., C.M.GLASG., F.R.C.S. EDIN.,
MAJOR, R.A.M.C. (T.F.)

THE interesting features of this case are: 1. The emergency of the operation. 2. The difficulties experienced on account of the depth of the vessel at the high seat of ligature whilst at the same time the hole in the artery had to be plugged by the finger of the left hand of the operator to control the alarming hæmorrhage. 3. The ball-valve action of the fragment of shrapnel in the artery, which undoubtedly saved the patient's life.

No. P/822, Private H. S., 10th Prussian Infantry, prisoner of war, was admitted to hospital on April 26th, 1917, in a collapsed and blanched condition, with signs of severe hæmorrhage from a punctured wound about half an inch below and towards the centre of the right clavicle. The hæmorrhage had, however, ceased for the time being. The patient was treated on general lines and improved. There was also musculo-spiral paralysis of the right arm, fairly well marked, with drop wrist. On the evening of the second day after admission a second and severe hæmorrhage occurred, and simultaneously a soft swelling developed under the clavicle. The patient was removed to the operating hut absolutely collapsed, pallid, with no pulse felt at right radial, and only a very feeble and rapid pulse at left.

Intravenous saline infusion was attempted while patient was being anæsthetised, but owing to the collapsed condition of the veins was impracticable, so subcutaneous was commenced. However, during the progress of the operation a vein was struck, and intravenous infusion was continued throughout. An incision was made parallel to, and half an inch below, the clavicle, and both pectorals were divided. A large blood clot, the size of a duck egg, was found. As this was cleared away an alarming fountain of blood burst forth. A finger was plunged deep into the wound which controlled the bleeding. It was found that there was a hole in the subclavian artery at about the juncture of the second and third part of the vessel. A piece of shrapnel about the size of a small haricot bean was felt inside of the artery and partially blocking the opening.

The course of the vessel was exposed under difficulty, as one hand was fully occupied in controlling the hæmorrhage, and a ligature was placed round the subclavian as high up as possible about the beginning of the second part. The piece of shrapnel was removed and the tear in the vessel clearly demonstrated. The pectorals were repaired and the wound stitched except at the outer end, which was drained.

The patient's condition was very grave, and remained so during the night. Saline infusion was kept up at intervals for the next 24 hours. With the exception of slight superficial suppuration of the wound the patient's recovery was rapid and uninterrupted. On the fifth day after the operation the radial pulse was perceptible and gradually increased in volume, and the musculo-spiral paralysis showed signs of improvement later.

The number of days from the time this man was wounded to the day of operation is not known, but as he was operated on at the base, where he arrived as a sitting case, it is probable that many days elapsed.

I am indebted to Lieutenant E. Wragg, R.A.M.C., for his assistance at the operation and for his care in the after-treatment of the case.

A CASE OF COMPLETE OBLITERATION OF THE ULNAR ARTERY BY SUPPURATION.

BY JEHAN M. BARLET, M.D.,
MEDICAL OFFICER IN CHARGE, FRENCH HOSPITAL; AIDE MAJOR, ARMÉE FRANÇAISE.

THIS case is recorded to show the complete disappearance of the ulnar artery for a distance of 8 inches due to suppuration. The patient made a perfect recovery and has the use of his arm, which he can use to manipulate his crutches.

The patient, aged 24, was admitted to the French Hospital on April 30th, 1917, having been wounded six days before; he was suffering from a seemingly superficial flesh wound of the left forearm. He had also had his left femur amputated in the lower third. On admission his temperature was 101° F. and pulse 110.

On May 9th he had considerable swelling of the forearm, which was opened up and pus found in the deep layer of muscles; drainage-tubes were put in reaching from elbow to wrist. At midnight he had an attack of secondary hæmorrhage when the tubes were removed by the house surgeon. This was followed by two more attacks of secondary hæmorrhage at midday and 7 P.M., which were controlled by a tourniquet. At 9 P.M. on the 10th he had a further hæmorrhage, whereupon I had an anæsthetic administered and cut down upon the brachial artery, which was bleeding at the bend of the elbow, but being unable to tie it off a pair of Spencer Wells forceps was left on.

Two days afterwards it was decided to cut down and tie the ulnar artery, but upon opening up the forearm under $CHCl_3$ it was found that the ulnar artery for the greater part of its length had been destroyed by ulceration, and only the two ends were left, so ligatures were applied—one just below the bifurcation of the brachial artery and the other at the level of the pisiform bone. The arm was treated throughout by means of the Mencière solution.

I am indebted to Mr. W. H. Clayton-Greene, senior surgeon of the French Hospital, for permission to publish this case.

Bedford Court Mansions, W.C.

ROYAL VICTORIA HOSPITAL, BELFAST.—The clinical winter session at the Royal Victoria Hospital was opened with an address by Dr. W. Calwell, in which he referred to the fact that five of the full staff of the hospital were at the front, and that all the auxiliary staff were or have been serving. Including former and present members of the medical school, the following honours had been won: 1 V.C., 2 C.B.'s, 3 C.M.G.'s, 1 C.I.E., 4 D.S.O.'s, and 15 M.C.'s, while 21 persons were mentioned in despatches. In conveying a vote of thanks to Dr. Calwell, Sir John Byers, who presided, incidentally referred to the brilliant work done by an old student of the school, Major Robert McCarrison, as show in his book, "The Thyroid Gland in Health and Disease."

[3] Jordan Lloyd: Jour. Path. and Bact., 1916, xxi., 113.
[4] Shearer and Crowe: Proc. Royal Society, 1917, Ser. B, lxxxix., 422.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF ANÆSTHETICS.

Anæsthetics in Home Military Hospitals.

A MEETING of this section was held on Nov. 2nd, Mr. GEORGE ROWELL, the President, being in the chair.

Lieutenant-Colonel J. F. W. SILK, R.A.M.C., opened a discussion on Anæsthetics in Home Military Hospitals. He said that chloroform, pure and undiluted, was to be avoided when possible. The mortality was high even with skilled anæsthetists when using chloroform. He thought it was of value in many cases, especially when given diluted with ether and by the open method. For *short cases* three methods of anæsthesia were suitable: (1) local anæsthetics, perhaps not used as often as might have been expected before the war; (2) N_2O; and (3) ether, which should be given preferably by the open method. He thought that the preliminary injection of morphia and atropine should be almost a routine. Sometimes hyoscine was added to the mixture. If ether was to be administered atropine should always be given as it dries up the mucous secretion. As to the time of the injection he thought the orthodox hour before the operation was too much. He would give it half or even a quarter of an hour before, for choice, and it should be given in the anæsthetic room rather than not at all. He advised morphia ¼ gr., and atropine 1/100 gr. For the mask he preferred gauze to lint. When time was no object he thought ether should be used from the beginning, otherwise it was best to begin with a mixture of chloroform and ether. To hasten induction he often began with ethyl chloride dropped on an open mask, or used ether in a Clover. He liked McCardie's drop-bottle, as the amount could be easily regulated and the bottle was not easily broken. He now used a nasal tube passed back into the pharynx, which ensured a free air-way even if the jaw muscles became stiff, and the tube could not be occluded even if the epiglottis and tongue fell back. Most hospitals were provided with Clover inhalers, and he had suggested McCardie's proportion of one drachm of chloroform to each measure of the inhaler; he preferred the open method. Less chloroform and more ether had been given in home hospitals than in the past year with increased safety to the patients. With regard to anæsthetics in special cases, he thought that in *shock* too much morphia could not be given, but it should be avoided in septic cases, and in patients with malaria or heart trouble. In these cases chloroform should also be avoided. As little anæsthetic as possible should be given, and it should be diluted with oxygen, which could be bubbled through the ether. Nitrous oxide and oxygen were valuable, but the apparatus militated against its use, and he was not satisfied as to the anæsthesia which was produced. Warm ether was of advantage in these cases. Continuity and regularity were great points in success. In *intracranial* cases morphia was unnecessary, and here also very little anæsthetic should be given. He preferred chloroform as it lowered venous congestion. In *empyema* the mortality was severe. For these cases he preferred intratracheal methods and thought that the patients should be concentrated in the better equipped hospitals where this apparatus was used. Otherwise he preferred chloroform and oxygen. In *spinal cases* the patient had to lie on his face and the chest was consequently compressed, so that the anæsthetic had to be pumped into him, and venous congestion was always present. He thought chloroform and oxygen the most desirable method. In *orthopædic surgery* spinal anæsthesia was not used as much as one might have supposed would be the case. Nitrous oxide was often used and acted well when given with ether, but venous congestion should be avoided; warm ether produced this. In *plastic surgery* of the face and allied conditions the chief difficulties were caused by the blood and mucus which collected in the mouth and pharynx; there was also the difficulty of manipulating the anæsthetic with a fixed or very mobile jaw. In the majority of cases exceptional methods were necessary, and of these he mentioned four: 1. *Intratracheal.* This was not necessary in all or even in the majority. 2. *Intubation* was little known in this country, but had many advantages; it was easy to introduce Kuhn's tube, which could be packed with gauze round the pharynx, thus preventing blood from entering. 3. *Rectal ether-oil* method. In this there were two important points: (*a*) the patient should have morphia and atropine before; and (*b*) the anæsthetist should himself see that all remnants of ether-oil were washed out of the rectum. 4. *The sitting position.* In this the patient sat bolt upright and anæsthesia was produced by passing oxygen and chloroform or other vapour through a nasal tube. This method had been in use for over a year at one of the principal facial hospitals, and so far no fatality had occurred. The speaker asked for views as to the cause of ether bronchitis.

Mr. BELLAMY GARDNER said that in the nasal air tube a very important method of overcoming a difficulty had been evolved. Apart from the adoption of the mouth prop the only other suggestion was tracheotomy. He thought the mouth prop should always be used.

Dr. J. BLOMFIELD said that in plastic surgery he had been led to appreciate the intratracheal method.

Major H. D. GILLIES, R.A.M.C., said that, by Colonel Silk's advice, he had adopted the sitting position and also intratracheal methods. In plastic surgery an anæsthetist was needed who could give every known form of anæsthesia. It was often impossible to use the intratracheal method owing to the form of injury. The sitting position had the advantage that the tongue and jaw tended to fall forward. Nitrous oxide and oxygen had given good results. Each case had to be considered from the anæsthetic point of view. The intratracheal was the ideal method if it could be done. Kuhn's tube was a good substitute, but the large apparatus in the mouth was a disadvantage. Chloroform and oxygen given through the nasal tube, with the patient in the sitting position, had given good results.

Dr. F. E. SHIPWAY said that he always induced with chloroform and ether on the open mask and then continued with ether. He did not agree with Colonel Silk's opinion that too much morphia could not be given in cases of shock. Morphia was a depressant, reduced temperature, lowered blood pressure, and diminished excitability, thus producing a condition similar to shock. When shock had developed he thought that morphia should not be given in larger doses than 1/6 of a grain, or 1/4 grain at the outside. In empyema he preferred ether or warm ether. Light anæsthesia was very necessary. In facial cases he preferred intratracheal ether, and in only 6 per cent. was he unable to pass the catheter. The advantage to the patient was the absence of post-operative vomiting—a consideration when many operations had to be done. Sickness could not be avoided after chloroform in the sitting position. Ether-oil per rectum was occasionally a very valuable method, but he doubted if it were free from danger on account of irritation of the lower bowel. Mr. H. M. Page had suggested less ether, but Major Gillies found that less than the amount recommended by Gwathmey was not enough.

Captain H. EDMUND G. BOYLE, R.A.M.C, said that it was both wrong and dangerous to induce with chloroform; ether or a mixture of gas and ether should always be used. He did not agree that the apparatus militated against the gas and oxygen method. Speaking of plastic surgery, he said that he had anæsthetised 23 cases with ether-oil per rectum and had tried to change the dosage. He now used paraldehyde 1 drachm, olive oil 2 ounces, and ether 4 ounces. He had had no cases of irritation of rectum. He thought the mouth prop should always be used, and that the nasal tube was not needed.

Mr. PERCIVAL P. COLE said that very well-trained anæsthetists were necessary for plastic operations on the face. He thought it was rarely impossible to pass the tube. Kuhn's tube was not so good, as the operations usually lasted a long time, and the physical exhaustion produced on the patient by breathing through Kuhn's tube was marked. This did not occur with the intratracheal method. Vomiting was rare.

Colonel SILK said in reply that the ether-oil method required care. He had never had a case of rectal irritation. In shock he recommended a quarter to half a grain of morphia. He was pleased to find that the meeting was so thoroughly in accord with his condemnation of undiluted chloroform for routine use in military hospitals.

Dr. H. R. PHILLIPS demonstrated an apparatus for administering oxygen with ether and chloroform. The oxygen, contained in two cylinders, was passed through hot water contained in a copper tank, and thence through the chloroform or ether, or through both.

Reviews and Notices of Books.

1. *The Cancer Problem: A Statistical Study.* By C. E. GREEN, F.R.S.E. London: W. Green and Son, Limited. 1917. Pp. 140.
2. *Cancer, its Cause and Treatment.* By L. D. BULKLEY, A.M., M.D., Senior Physician to the New York Skin and Cancer Hospital. Vol. II. New York: Hoeber. Pp. 282. Price $1.50.

1. DISCARDING the conventional methods of death-rates per million living favoured by the generality of statisticians, Mr. Green presents his figures in the form of one death from cancer in so many deaths from all causes, and perhaps to show his contempt for the paper-economy campaign he gives the same data over again as deaths from cancer in 100 deaths from all causes. The product of the corresponding figures in the two columns being 100, one or other is redundant. This arithmetical comedy occupies eight large quarto pages devoted to England and Wales alone, and never a word as to the year or years to which the figures refer. This probably accounts for our failure to find any simple arithmetical relation between Mr. Green's figures and those of the Registrar-General.

2. Dr. L. D. Bulkley advocates very definite views in his book on cancer, of which Volume II. is in our hands. He believes that cancer is a disease of disordered metabolism set up by an unphysiological mode of life, and particularly by dietetic errrors, causing constipation and imperfect excretion of waste products. A strict vegetarian diet (butter and eggs are allowed, but not milk), abstinence from alcohol and tobacco, with the administration of potassium salts, constitute the treatment he recommends. For this regimen he claims the cure of cancer without operation, the prevention of recurrence after operation, and a strong probability of prophylactic value if adopted before the cancer age. Dr. Bulkley's condemnation of the surgical treatment of cancer is only slightly tempered by regard for his surgical colleagues of the New York Skin and Cancer Hospital. Dr. Bulkley is unconvincing.

Essentials of Medical Electricity. By E. R. MORTON, M.D., and E. P. CUMBERBATCH, M.A., M.B., B.Ch. Oxon. Third edition, revised and rewritten by Dr. CUMBERBATCH. With 11 plates and 72 illustrations. London and Glasgow: Henry Kimpton. Pp. 303. Price 6*s.* net.

THE present edition, the work of Dr. Cumberbatch, has been entirely rewritten "so as to include the new methods and at the same time present the subject in the light of the newer and clearer knowledge of the way in which electricity acts in the cure or relief of disease." In Chapter I., commencing with an account of the theory of ionisation, illustrations are given of the manner by which electrolytes may be produced within the body either at the entrance, the exit of the constant current, or along its path between the two electrodes; also of the means by which new electrolytes may be introduced into the system from without. During its passage the current stimulates the nerve-endings of the sensory nerves and the afferent end-organs within the muscle and skin. With an interrupted current of certain strength and duration the muscles themselves contract. In the high-frequency current, where the frequency of reversal becomes extremely high (one million or more per second), there is no muscular contraction, no apparent stimulation of nerve, but *heat* is developed. The remainder of the chapter is devoted to a short description of the *modus operandi* of the static breeze, the high-frequency effleuve, the static spark and static wave current. In Chapters II., III., and IV. we find an account of the application of the constant current, and its modifications—simple, interrupted, sinusoidal, slow sinusoidal, and the faradic current—accumulators and dry cells. The principles of ionic medication are fully discussed in Chapters V., VI., and VII., and its application to medical and surgical treatment, including such cavities as the antrum, the colon and rectum, and the sinuses left after wounds; also the removal of nævi, stellate veins, moles, warts, and superfluous hair. Chapter VIII. refers to the effects of electrotherapy as a general stimulant to the tissues. Chapter IX describes the electrical treatment of various paralyses, including that of the facial nerve, trapezius, sternomastoid, serrati, deltoid, spinati muscles, of the arm and of infantile paralysis. Chapter X. gives a detailed report of the methods of testing the reactions of muscle and nerve, including that of condenser discharges, which may at the present time be considered to hold the field. The war has produced innumerable cases of paralysis after gunshot wounds in which a knowledge of the condition of the nerve and its muscle becomes essential. Still more recently the subject has been studied by the employment of a galvanic current of known and variable strength, and the relative value of the two is still *sub judice*. An explanation of the methods of production and application of high-frequency currents follows in Chapter XI., and leads naturally to the excellent account of medical and surgical diathermy, on which subject the writer is a well-known authority. A short chapter deals with static electricity, the static bath and breeze, the wave current, and the static induced current, with the technique required for each. Chapter XIV. contains a valuable alphabetical index of diseases in which electrical treatment may be employed and the suitable modality for each affection. The final chapter gives an explanation of certain physical principles of electricity, a knowledge of which is essential to the electrotherapeutist.

A comparison of the second edition (1910) with the present issue demonstrates the considerable advance which has been made in several directions, notably in the more general employment of ionisation, the more efficient examination of the electrical reactions of muscle and nerve, and particularly in the applications of medical and surgical diathermy. The work is well illustrated, the style is attractive, the matter is excellent and up to date. It may be recommended as a guide to clinical assistants in the electrical departments of our hospitals, and should also find a place in the library of those who follow the practice of electro-therapeutics.

Kala-Azar: Its Treatment. By UPENDRANATH BRAHMACHARI, M.A., M.D., Ph.D., Rai Bahadur. Calcutta: Butterworth and Co. 1917. Pp. 121. Price 8*s.* 6*d.* net.

THE first five chapters consist of numerous treatments, the relative merits or demerits of which it is not easy to estimate as the data supplied are insufficient. It is quite natural that in seeking for remedies for a deadly disease very many should be tried, but it is most unsatisfactory that therapeutic methods should be advocated which are unsupported by adequate evidence. The record of "permanent recovery in 25 per cent. of cases" by quinine treatment conflicts with the author's statement that "quinine is worse than useless." The remaining chapters are mainly concerned with the use of antimony in the treatment of the disease. We cannot from the information supplied form an opinion as to the real value of antimony in kala-azar or estimate whether colloidal antimony advocated by the author has any particular advantage over tartar emetic.

The mode of determining the value of the various treatments enumerated is simple. We have in kala-azar a parasitic disease, and in this case it is the parasiticidal value of a particular drug that we wish to know. The conditions necessary for solving the question are: (1) Determination of the presence of parasites in all cases observed; (2) determination in how many cases parasites spontaneously disappear; (3) determination in how many cases parasites disappear (temporarily or permanently) after drug treatment. Systematic work on this plan would be of value; the treatment of a few cases with this or that drug is almost valueless. The author's opinion that a combined antimony-soamine-electrargol-formaldehyde treatment will be better than any hitherto adopted does not give us much confidence.

Modern Man and His Forerunners: A Short Study of the Human Species Living and Extinct. By H. G. F. SPURRELL, M.A., M.B., B.Ch. Oxon., F.Z.S. Illustrated. London: G. Bell and Sons. 1917. Pp. 192. Price 7*s.* 6*d.* net.

Dr. Spurrell has written an extremely interesting book—indeed, it may be said that he has written two interesting books, for we are inclined to regard the pre-war portion as distinct from what may properly be termed the war book. We have in the pre-war portion a constructive effort to outline the probable phylogeny of modern man, and in the war portion a philosophic discourse upon civilisations past and present and speculations upon the ultimate destinies of humanity. Both parts are written in an engaging style, making the book easy and pleasant to read.

The first part deals with the probable primate ancestry of man and with the known fossil human remains. We note

in this part three distinct features for analysis, though some dissection is necessary for their discernment, since all are blended together into a single interesting entity. First there are records of observations made in many parts of the world upon man and his probable mammalian allies. Here we meet with a certainty in touch which must impress any reader; and here, beyond doubt, is matter of permanent value. Next there are speculative deductions as to the early attainment of human characteristics; again there is firmness in the handling of the subject. Finally, there are accounts of the fossil remains of man, and deductions as to the actual early forms of the human race; here, although the style is easy and attractive, the touch appears to be less certain, and complete confidence seems to be expected from the instructed reader through the medium of a pleasing phraseology, rather than from the author's deep or critical examination of recorded facts. Such, in broad outline, is the structure of what we are regarding as the pre-war portion of Dr. Spurrell's fascinating book.

In the second portion of the book Dr. Spurrell reveals himself as a philosophic essayist, one armed with a wide classical and historical knowledge, a judicious (if somewhat pessimistic) turn of mind, and a facile pen. To review his essay in critical spirit is to spoil an intellectual treat for the reader. The whole essay forms a delightful study. It is possible that for some the impending gloom, which seems for ever ready to be written into these philosophic passages, will appear unjustified. There are many at hand buoyed up in the belief that after the war humanity will enter upon a better, a fuller, and a higher phase of evolution. There are many who hold as a cherished creed the belief that civilisation itself may evolve, and that far from being a hard taskmaster for its myriad slaves, it will itself become the servant of humanity. But it matters not what may be the ideals or the creeds of the reader; he will find himself vastly in the debt of Dr. Spurrell.

JOURNALS.

Revista de Medicina (Cartagena).—Trichinosis is a little-known disease in this country. That it is still, however, capable of proving a serious scourge is shown by the unfortunate experience that in 1914 befell Algar, a small township a few miles from the Spanish seaport Cartagena. Under the title, La Epidemia de Triquinosis del Algar, del Año 1914, Dr. Antonio Rosique gives in the *Revista de Medicina* an interesting account of the epidemic. The total number of cases was 275, of which 104 were severe, 63 of medium intensity, and 108 light cases. Dr. Rosique began by treating his cases on the lines laid down in the text-books, but was very soon convinced of the absolute inefficacy of the classic methods of treatment. "The first deaths," he says, "and the rapid increase in the number of serious cases made one fear a veritable hecatomb, and the epidemic, in view of its gravity and of the large number of persons attacked, not merely authorised but imperiously called for the trial of other methods." Five different drugs were put to trial by Dr. Rosique—namely, emetine hydrochloride, methylene blue, grey oil (injectio hydrargyri hypodermica), neosalvarsan, and cyanide of mercury. Emetine was found to be absolutely inefficacious, while methylene blue was not merely useless but seriously objectionable, in that it caused nausea, diarrhœa, partial suppression of urine, and painful abscesses which were slow to heal. Grey oil was found to be of great value and, in the doses employed, entirely free from objection. Of 107 cases treated, of which 49 were grave, all recovered, only a few reaching the cachectic phase. Against the trichina neosalvarsan proved itself a drug of great activity, "veritable resurrections" being witnessed in some very grave cases in which it was administered. It should not, in Dr. Rosique's opinion, be used in cases in which the nervous system is much involved, as it is in these cases inefficacious and somewhat dangerous. Of 20 cases treated by neosalvarsan 2 died. The cyanide of mercury is, says Dr. Rosique, "the medicament *par excellence* in the treatment of trichinosis in all its forms and in every degree. It is admirably borne by the patients, and in not one single case, not even in the gravest, did improvement fail to show itself immediately after the first injection. We recommend as the treatment of election in trichinosis, being the most efficacious known to us at present, intravenous injections of cyanide of mercury. Of 22 cases treated, 3 being of extreme gravity, all improved rapidly from the commencement of the injections. None died. The dose employed was from 4 to 7 centigrams." Dr. Rosique summarises as follows: "Trichinosis is not a disease in the presence of which, as the profession had almost come to believe, the physician can do no more than fold his arms and adopt an expectant attitude while watching the struggle between the disease and the organism. It is a disease curable in every case by the timely employment of what we may describe as its specific remedy, mercury, given either in the form of grey oil in large doses by deep intramuscular injections, or, better still, in the form of the cyanide of mercury by intravenous injection. Treated by this drug not a single case of the disease ought to be lost."

Maternity and Child Welfare. Vol. I., Nos. 9 and 10. Price 6*d.* net each.—The August number of this periodical was mainly concerned with baby welfare exhibitions, and this number (September) with nursery schools and the possibility of their development under the new Education Bill. Miss Margaret McMillan's article on this subject is inspiring; her idealism does not make her unpractical. Possibilities of closer coöperation between rescue-workers, hospital authorities, and other organisations dealing with unmarried mothers and illegitimate children are discussed in an interesting article by Miss H. M. Morant, and a useful list of homes for these children is given under the heading Child Welfare Directory. The illustrated notes on the Child Welfare Exhibition at the Central Hall last July are especially useful to those about to organise local exhibitions, and that dealing with the work of the Royal New Zealand Society for the Health of Women and Children is of extraordinary interest. The problems connected with the care and upbringing of the illegitimate child and the complete lack of adequate State control in the matter are ably dealt with in No. 10 of this publication. A most amusing imaginative description of "How our Infant Mortality was Halved" is written by Graeme Halkerston. The excellent Atlas and Gazetteer is continued, and there are interesting articles on Infant Welfare in Paris, on Mothers' Clubs, and on Air Raid Precautions and Ventilation, by Dr. S. Davies.

Archives de Médecine et de Pharmacie Navales.—In the number for June, 1917, we find an interesting account by Dr. Pélissier, staff surgeon in the French Navy, of the experiences of a party from the *Ernest Renan* battleship, which formed part of the international force sent to occupy Scutari in May, 1913 in the second stage of the first Balkan War, when the Balkan League was beating Turkey down. They arrived in the town some little time after its capture from the Turks, and found it, like any town after a siege, very dirty. They cleaned up barracks for themselves and appear to have suffered little from illness, though much from flies, and a great deal in May from a plague of fleas. Thanks to quinine and mosquito-nets they escaped malaria. They found the water-supply had been investigated bacteriologically by the Turkish physicians and passed as safe, but when the warm weather came on they sterilised all drinking water, at first by boiling, but as that proved awkward it was replaced by a chemical method, 6 per 10,000 of permanganate of potassium being added for half an hour, and then 2 per 10,000 of tartaric acid. After an hour's sedimentation the water, now sterilised, was used for drinking. The quantities of reagents were clearly in excess of what is necessary. The Turks are stated to have had but poor ambulance service, and the fortune of war was always against them; the Serbian service was well organised, while the Montenegrin wounded had only the care of two brave and devoted French Red Cross workers, Dr. Ratel and Mdlle. Fricht. The descriptions of the battle-fields of those old days, with their barbed wire and shell holes made by three- and four-inch shell, are commonplaces of to-day, but Dr. Pélissier, if his report was, as we suppose, written and sent in in 1913, deserves credit for his early appreciation of the greater incidence of wounds on the head and shoulders in modern fighting, and for his clear statement that many men were lost through wearing caps which should be replaced by protective head coverings. An astonishing instance is given of endurance. An Albanian was shot through the abdomen from front to back; he fell backwards into a marsh in which he sank up to the neck. There he remained for a week, the only person to come near him being another Albanian who went through his pockets. On the ninth day he was taken to hospital, when his wounds were found closed, but his hunger was noted to be wolfish. He recovered easily.

THE LANCET.

LONDON: SATURDAY, NOVEMBER 10, 1917.

The Causation of Disease.

THE study of causation in relation to any series of natural phenomena is one of the greatest interest to thoughtful and scientific minds, and at the same time it is beset with pitfalls and fallacies to an unusual extent. The investigation of the causes of disease is one of the most baffling problems in medical science, and yet it is among the most essential and fundamental studies for the scientific practitioner of medicine if progress is to be made on right and hopeful lines. Professor ERNEST S. REYNOLDS, in choosing this problem for the subject of his Bradshaw lecture, delivered before the Royal College of Physicians of London on Nov. 8th, briefly reviews the whole field of medicine and has endeavoured to render more precise our conceptions of the actual causes of disease, and in so doing to evolve a practical nosology based on causation—which is obviously the most scientific form of classification. In so doing he has produced an instructive and stimulating essay which will well repay thoughtful consideration and study. He begins his observations with some definitions, always a difficult matter, and then makes brief reference to the methods available, from the logical and experimental standpoints, for the investigation of causes, in which he acknowledges his indebtedness to the work of Dr. CHARLES MERCIER. Professor REYNOLDS confesses his surprise at not finding a satisfactory definition of disease, and he is of opinion that we may safely define "disease as that condition of an individual in which there is, apart from the normal changes due to age, an alteration of the structures or functions or sensations usually found in the average man of any particular race." We may agree that this offers a comprehensive conception of disease, and that it is an advance on that usually offered—viz., that disease is the opposite or converse of health. At the same time the confusion between disease as a generic term and diseases as applied to individual instances of abnormal conditions remains, and we may quote from an old and honoured text-book of medicine[1]: "In truth both Disease and Health are incapable of precise definition because they are not scientific terms. They are descriptive, popular, and subjective. 'Disease' is 'discomfort.' Whatever causes bodily uneasiness or whatever by experience will sooner or later cause it, whatever interferes with our bodily functions, whatever tends to death, is disease." The difficulty of definition indicated in the famous text-book remains.

Professor REYNOLDS clearly distinguishes between effect, result, cause, and condition, and for these fundamentals he adopts Dr. MERCIER'S excellent definitions. The last two of these we quote, cause being regarded as "the action or cessation of action connected with a frequent change or accompanying unchange in the thing acted on," while condition is "a passive state of or about the thing acted on by a cause and material to the effect." It will be seen, therefore, that under this arrangement the factors of age, sex, climate, and previous history, which were formerly classed as predisposing causes, should in the interests of scientific accuracy be classified as predisposing conditions, and the word cause strictly confined to the actual exciting action or dynamic cause. We are cordially in agreement with Professor REYNOLDS in emphasising this point of view, since it tends to render more precise the conception of causation and to make for more accurate investigation. The exposure of fallacies in regard to causation is a most important matter, and Professor REYNOLDS draws attention to what may be considered the two most common ones—namely, the *post hoc, propter hoc* fallacy, and coincidence. The former of these he paraphrases aptly with the remark: "It cannot be too strongly asserted that mere sequence does not establish causation." And he points out the danger of the fallacy of pure coincidence, which is no doubt due to the dramatic appeal it makes to consciousness. To eliminate such fallacies the greatest care is necessary in applying the methods of investigating cause and effect.

In order to reduce the problem of the classification or analysis of causes of disease to its simplest Professor REYNOLDS considers it in parabolic form. He imagines 1000 healthy men and 1000 healthy women, each aged 20 years, free to marry and with no hereditary taint, put to live in a perfectly healthy island with sufficient flora and fauna to maintain life: and then he attempts to forecast the various affections from which they and their progeny to two or three generations are likely to suffer if free from admixture from the rest of the world. Under such conditions we may assume that the factors of causation would be easier to trace, and Professor REYNOLDS groups them under ten headings—namely, injury, food and feeding, poisons, occupation, stress, abnormal metabolism, abnormal age changes, neoplasms, parasites, and heredity. He suggests that if unrestricted immigration into the island were permitted we should not introduce any new group of causes of disease, but there would be a marked intensification of at least three of them—namely, stress from increased competition, parasites, and heredity. The problems of causation of any disease of obscure origin may thus be considered in relation to these groups of causes, and in illustration of this Professor REYNOLDS takes a disease in which he has been interested and upon which he has made many observations—namely, disseminated sclerosis, a not uncommon disease of which the morbid anatomy is established, but the causation and pathology of which are obscure if not unknown. He thinks that after careful study of the disease and the conditions under which it occurs, we can eliminate injury, food, occupation, stress, age, neoplasms, and heredity, also extrinsic poisons, thus leaving intrinsic poisons, altered metabolisms, and parasites or their toxins

[1] Fagge and Pye-Smith: Text-book of the Principles and Practice of Medicine. Third edition, vol. i., p. 2. Churchill, London, 1891.

for consideration. By applying certain of Dr. MERCIER'S criteria, he comes to the conclusion that disseminated sclerosis is caused by a poison acting on certain special nerve tissues; but whether it is due to intrinsic poisons from perverted internal secretion or derived from the alimentary canal, or to some specific organism as yet undiscovered, he admits that it is not possible to determine at present; and he points out the important field of research here available and the similar problems awaiting solution in regard to other diseases, such as rheumatoid arthritis and spleno-medullary leukæmia.

There would seem to be little to criticise in Professor REYNOLDS'S ten groups of causes, though to utilise them for purposes of the classification of diseases is not quite so simple as might at first sight appear—and it is only fair to him to admit that he recognises this. Allowing for the fallacy of regarding conditions as actual causes, there is still the possibility of multiple causation to reckon with, and in this event a given disease might well come under two or more of the causative headings. Again, the vital reaction to different causes may be identical; for example, Professor REYNOLDS is prepared to admit that the effect of "cold" may be to induce a condition of nephritis analogous to that produced by micro-organisms or their toxins. A further difficulty may conceivably arise in connexion with poisons, since they may be extrinsic, intrinsic from metabolic defects, or they may arise from the activities of parasitic organisms, either animal or vegetable, either in the alimentary or respiratory tracts, on the surface of the body, or in the tissues themselves; the exact classification of diseases produced in these ways might be a matter of some difficulty with our present knowledge or lack of it. We need only instance the effects of intestinal stasis in illustration. The construction of most modern text-books of medicine is a striking illustration of the difficulties of classification of diseases. We could wish for some uniformity in this matter, both in text-books dealing with clinical or descriptive medicine and those devoted to prevention. Obviously the etiological classification is the ideal one, for a knowledge of causation is essential for prevention and highly desirable from the points of view of diagnosis and treatment; though it is well to recognise that an effective treatment can be discovered for a disease of unknown causation, and that the discovery of the cause does not necessarily at once lead to the evolution of a specific treatment. It is evident that even so simple a grouping of causes as that offered by Professor REYNOLDS would not be satisfactory for a text-book classification of diseases, and that the present compromise arrangement, which is partly etiological and partly topographical, though unscientific, is yet convenient, especially for purposes of reference. This, however, does not detract from the value of real classification and is no criticism of it, but only a confession of the gaps in our knowledge and of the need for accurate and combined research into causation upon the lines laid down in the Bradshaw lecture.

Medical Students and the Shortage of Medical Men.

AT the commencement of the war much difference of opinion was manifested as to the advisability of using medical students for combatant service, it being clearly seen that if this policy was pursued in any general way there would sooner or later be a shortage of practitioners in this country. It was not foreseen that the shortage would actually affect us during the war, for those who put the duration of the struggle as three years at the outside were regarded, especially by those who knew least, as unduly pessimistic. But it was widely pointed out that even a war of two years' duration, if it shut off all recruits from the medical profession, would have an evil outcome that was not receiving sufficient consideration. The medical profession is wanted with equal urgency for military and civilian purposes, and it is a profession whose briefest range of training must be taken at from five to six years. The policy of suspending all recruits to its ranks must therefore be dangerous, though it would, of course, be justified by the knowledge that the addition of our potential medical men as combatants to our army, when numerically so small, was a factor of greater importance. And this is how the matter came to be regarded by those in authority in the early days, and the view taken by Lord KITCHENER was backed by the spirit of the medical students themselves, who with unanimity declared their intention of joining the forces at the earliest opportunity. The question was one of policy, and one on which men of equal ability to judge differed strongly; and as a result a compromise scheme was employed whereby senior students, who were enrolled in the combatant ranks, were recalled by the War Office and directed to complete their curriculum with a view to qualification for the Royal Army Medical Corps, the junior students being subject to enlistment or encouraged to train as officers.

It would seem that this compromise was also based on the probability that the war would be over within two years. In that case the measure of its inconvenience to the country would be that, when a shortage of qualified medical men occurred, it could only be partly compensated for by the increase in the number of qualified medical women. But during 1915 and 1916, as during this year, it became clear that the shortage of practitioners due to a decreased number of qualified men registered, would have effect for a longer range of time than was estimated, and would be aggravated by a growing depletion among those who were qualified, whether carrying on medical work with the Navy and Army or at home. We have a total medical service of so many thousand men—the figure is not given because it varies enormously according as to what we include as effective—of whom at least half the effectives on any basis of calculation are now in naval or military employ. Of the remainder a large proportion are not in military employ because of their age, although their professional work is most valuable. In both these classes it is clear that the death-rate

will be comparatively high. We know that the number of medical men who have been killed or disabled in discharge of their duties with the Navy and Army forms an appreciable percentage of the great number employed, while it is obvious that at the other end of the scale, among the men of advanced age, the death-rate from natural causes must operate with force. We have therefore now a double wastage in a service which is absolutely necessary for the well-being of the nation as a whole, and for its fighting forces by sea and land—the two things are not separable, for the quota that is not fighting is working, against time and against fatigue, to support the combatant quota. But no recruits are coming in to this diminishing section of the national activity save a certain number of female practitioners. The strain will continue to be met, and only in few districts is there any sign yet of an inadequate medical service, judged by the standards of real safety; but it is a serious thought that this position may have to continue for some undefined period after the war.

Last week an unauthorised statement was published in a lay paper to the effect that within the next few days all the medical students who were serving in combatant positions in the Army would be demobilised and sent back to their medical schools. The information was not correct, if only because it has not yet been decided exactly what move in this direction will be taken by the authorities; but we are glad to learn that the matter is receiving official attention at the present moment. It is to our mind an enormously important question, and we are very glad to learn authoritatively that it is being treated as such. We are perfectly aware that man-power must always be of paramount urgency in every practical course undertaken by a War Minister or a War Council, while the sacrifice of life that has necessarily taken place among our young combatant officers puts a special value for military purposes upon the very class of youth who had already embraced, or who had intended to embrace, the calling of medicine. Those wanted as young doctors are exactly those who are wanted as young officers. Seeing all this, we do not think that the policy of those in authority in 1915 was wrong for its time and in its circumstances, but none the less we are glad to learn that it may be revised now. We should like to hear that all medical students at present in the Army, who had begun study in the direction of medicine before the war broke out, have been permitted to return to their schools, but so sweeping a policy cannot be followed out. The figures produced to the Army Council do not, as yet at any rate, warrant it, while other difficulties as to the status of students present themselves. Meantime students who had begun their curriculum prior to August 1st, 1914, and had at the time of enlistment completed two years of the course, may claim to be returned to their studies under the Army Council Instructions of 1917. They must proceed to get their qualifications with all possible expedition. That the conduct of medical schools is impaired by the war is, of course, obvious, but if the teaching staffs are thinned the supply of material is sadly abundant, and the schools should be more flexible in their conduct of education during the hour of stress. We do not want to meet the case of the shortage of medical practitioners by lowering the standards of practical efficiency for those who prepare to enter our portals, but by as much as the academic side of their training or examinations can be abbreviated, and the practical work of pathology attacked directly, by so much the quicker will the existing troubles be arrested.

Annotations.

"Ne quid nimis."

THE SCIENTIFIC BOYCOTT.

AT a meeting of the Société Internationale de Chirurgie, held in Paris on Nov. 3rd, and attended by delegates from Belgium, France, Great Britain, Serbia, and the United States, the following course of action was agreed upon:—

1. The Société Internationale de Chirurgie will be dissolved, as after the publication of the volume of Transactions of the meeting held in New York on April 14th, 1914.

2. If there should be any assets after the publication of this volume the money will be divided *pro rata* amongst the members, so that each member of the Germano-Austrian group shall receive his share, but the shares belonging to members of other nations will be retained and applied to some object of scientific repatriation in Belgium.

3. A new society will be formed after the war on a basis similar to that of the Société Internationale de Chirurgie to be called the Société Interalliée de Chirurgie.

This society will also be open to such surgeons of neutral countries as may be nominated for election by the general committee, and the purport of the dissolution of the old international gathering will be achieved by the exclusion of the Austro-Germanic adherents.

INFUNDIBULAR TUMOUR IN A CHILD CAUSING DIABETES INSIPIDUS AND TOLERANCE OF ALCOHOL.

THE following case is reported by Dr. L. Newmark, of San Francisco, in the *Archives of Internal Medicine* for April last:—

The patient was a child of 14, who developed unquenchable thirst about the age of 9. It was ascertained that the boy used to drink as much as two gallons of water during the night and that a bucket of a capacity of four gallons was placed in his bedroom as a urinal and was regularly found half filled in the morning. The father added that the urine looked like the water the child drank. Its specific gravity varied between 1002 and 1006; sugar and albumin were always absent. Gradually he began to crave stronger drink, and severe beatings at home did not deter him from various tricks to obtain wine. He would drink three or four glasses of beer in rapid succession or a similar quantity of wine. He took whisky also, it was discovered, but he was never drunk or affected by drink. After a bout, when four quarts and a pint of beer were consumed, he reported at school and performed his tasks well, as usual. He was also early addicted to cigarette-smoking. At the age of 14, when seen by Dr. Newmark, he was found to be a weazened but alert and agile little boy, who looked not more than 10 and had not grown, apparently, for some years. The discs were normal and no defect of the visual field could be detected. A month later, however, increasing headache was complained of, and on re-examination the discs were found to show early optic neuritis; anosmia was present on both sides; the polydipsia was extreme. X ray examination showed a normal sella turcica, while the visual fields remained normal. The child died a week later and at

the autopsy a tumour was found, springing from the side of the infundibulum and occupying anteriorly the space between the anterior commissure above and the optic tracts below. The chiasma was flattened over the basal aspect of the growth, which was mainly interpeduncular and had distended the third ventricle and separated the hemispheres at the base. Microscopically it appeared to be of epithelial origin. All that could be found of the pituitary body was the pars anterior and remnants of the pars intermedia, infiltrated in parts by the large cells of the tumour. The pineal body was very small and showed definite atrophic changes, with disappearance of cellular elements.

The association of diabetes insipidus with toleration of drugs has been noted from time to time, but the latter cannot be due merely to the activity of the urinary secretion, or, rather, this fails to explain the exaggerated insusceptibility in regard to alcohol and other substances. In the present case the brain was not affected by alcoholic draughts to which immaturity and the presence of a large vascular tumour might be supposed to render it peculiarly sensitive. On what this immunity depended is matter for investigation, but it appears clear that the tolerance of alcohol is independent of diuresis. As for the polyuria, there is still uncertainty as to its mechanism and even as to the organ involved. There is abundant evidence to connect polyuria in a general way with disease in the neighbourhood of the hypophysis, but beyond that lie the difficulties. Excessive function of the posterior lobe has been offered as an explanation, then diminished function, then "dysfunction"; others have left the pituitary altogether and brought forward experimental evidence incriminating the grey matter of the third ventricle, finding there a centre for the regulation of carbohydrate assimilation and the water content of the organism. Further, growths in the pineal body have been associated with diabetes insipidus. At present the medulla and the floor of the fourth ventricle figure much less frequently than they used to in the pathology of the condition.

THE CONJOINT BOARD OF SCIENTIFIC SOCIETIES.

IN March last year, at the instance of the Royal Society, a conference was held with representatives of the leading scientific societies with the idea of establishing a Conjoint Board of Scientific Societies. The objects in view were that such a body should (1) promote the coöperation of those interested in pure or applied science; (2) should supply a means by which the scientific opinion of the country, on matters relating to science, industry, and education, would find effective expression; (3) should take such action as might be necessary to promote the application of science to our industries and to the service of the nation; and (4) should discuss scientific questions in which international coöperation seemed advisable. The scheme has since materialised: a conjoint board of scientific societies has been formed, and the personnel includes acknowledged leading authorities in every branch of scientific work. There has just been issued a report giving the aims, objects, and results of the first year's work (1916–17). Ten subcommittees were appointed and the majority have already presented final or interim reports. Amongst these are the International Catalogue subcommittee, the subcommittee on the Application of Science to Agriculture, the subcommittee on National Instruction in Technical Optics, the Watching subcommittee on Education, the subcommittee on the Prevention of Overlapping among Scientific Societies, the Metric System subcommittee, the Anthropological subcommittee, the Iron-ore subcommittee, the subcommittee on the Water-power of the British Empire, and the subcommittee on Timber for Aeroplane Construction. It will be seen that a very wide range of subjects is covered and the reports already furnished show where reforms are indicated and fresh organisations needed. The whole work is of supreme importance to the future welfare of the country, and it is reassuring to find such a capable body of scientific experts giving their earnest attention to the problems presented.

STREPTOTHRIX INFECTION OF THE LUNG.

IT has been noticed by several observers that the streptothrix is capable of producing in human beings pathological processes in the lungs, and this condition has been described under the name of pseudotuberculosis hominis streptothrica. A further contribution to the study of this interesting condition has lately been given by Professor Sanfelice, of the University of Modena,[1] who describes the case of a girl 14 years of age who presented all the symptoms of pulmonary tuberculosis, but in whom repeated examination of the sputum by every known method failed to detect the presence of Koch's bacillus. Subcutaneous inoculations with an emulsion of the expectoration were made in two guinea-pigs, and plate cultures in agar made of the same. One of the animals died after 14 days, and a small collection of pus at the site of inoculation developed colonies of streptothrix on agar plate cultures. The other animal died after 20 days with a small abscess at the site of inoculation, considerable enlargement of lymphatic glands, and small nodules in the liver, spleen, and lungs. Agar plates developed colonies of streptothrix, but in neither case were any acid-proof bacilli seen. Similar results were observed in plates developed directly from the sputum. The streptothrix isolated by Professor Sanfelice developed readily on the ordinary culture-media, both in the incubator at a temperature of 37° C. and at that of the surrounding air (15° C.). In plate cultures on agar the colonies did not attain a larger size than a pin's head, and were yellow in colour like those of *Staphylococcus cereoflavus*. Under the microscope they were composed of a thick network of fine filaments, which form at the periphery a bright ring visible to the naked eye. Plate cultures on gelatin had the same appearance, and there was no liquefaction of the gelatin. Broth cultures developed rapidly, not as a diffuse turbidity, but as minute granules which formed at the bottom without leaving any pellicle on the surface. Streak cultures on agar formed a soft yellow layer firmly adherent to the substratum, the surface of the layer being smooth and devoid of the wrinkles commonly met with in most streptothrices. Stab cultures in gelatin developed more freely on the surface than elsewhere, with the formation of numerous peripheral filaments, so that the culture assumed a star-like appearance. Unlike other streptothrices, development on potato was not exuberant, but after some days a thin yellow pellicle formed which was smooth and limited to the point of inoculation. Cultures developed for some days showed after staining numerous bacillary forms similar to *B. diphtheriæ* and a few long ramifying filaments. Emulsion of the plate cultures when inoculated into guinea-pigs produced typical lesions of pseudo-tuberculosis. From its morphological characters this streptothrix should, according

[1] Annali d' Igiene, Sept. 30th, 1917.

to Professor Sanfelice, be classified as belonging to that group of micro-organisms which represent the bond of union between diphtheritic and pseudo-diphtheritic bacilli and the group of streptothrices characterised by long branching filaments, and which develop on agar in compact layers with a wrinkled surface.

NEW REGULATIONS IN REGARD TO OPIUM AND COCAINE.

THE Home Secretary has called the attention of registered chemists and other persons authorised under the Defence of the Realm Regulations to deal in cocaine and opium to the fact that fresh regulations have been made under the Defence of the Realm Act as to the records which they are required to keep. The new Regulations are as shown:—

7. Regulation 40 B shall be amended as follows:—

(1) By the substitution of the following new subsection for Subsection (7):

"(7) If any person—(*a*) prepares opium for smoking; or (*b*) deals in or has in his possession any opium prepared for smoking; or (*c*) being the occupier of any premises permits those premises to be used for the purpose of the preparation of opium for smoking or of the sale or smoking of opium prepared for smoking; or (*d*) is concerned in the management of any premises used for any of such purposes as aforesaid; or (*e*) has in his possession any pipes or other utensils for use in connexion with the smoking of opium or any utensils for use in connexion with the preparation of opium for smoking; or (*f*) frequents any place used for the purpose of opium smoking; he shall be guilty of a summary offence against these regulations."

(2) By the substitution of the following new subsection for Subsection (8):—

"(8) Every person who has dealings in cocaine or opium (including sales to persons outside the United Kingdom) shall comply with the following provisions: (*a*) He shall enter or cause to be entered in a book kept for the purpose such particulars with respect to all dealings in cocaine or opium effected by him as the Secretary of State may prescribe; (*b*) he shall make the entry with respect to any transaction on the day on which the transaction is effected; (*c*) where he carries on business at more than one set of premises he shall keep a separate book in respect of every set of premises; (*d*) he shall keep the book in some part of the premises to which it relates so that it shall at all reasonable times be available for inspection by any person authorised in that behalf by the Secretary of State, and shall allow any person so authorised at all reasonable times to inspect it; (*e*) he shall not cancel, obliterate, or alter any entry in the book or make therein any entry which is untrue in any particular."

The regulations close with the warning that if any person fails to comply with any of the new provisions he will be judged guilty of a summary offence.

AN OCCUPATION NEUROSIS OF THE LOWER LIMB.

IN the *Medical Journal of Australia* Dr. J. C. Verco has reported the very rare condition of an occupation neurosis of the lower limb.

The patient was a fettler, aged 54 years, who was quite well until about eight months before, when he noticed a peculiar stiffness in the left leg. This gradually increased until it prevented him from doing his work properly, as well as from walking. Although he felt perfectly well while in bed, and could do anything he liked with the leg when lying down, and when he arose and began to walk quietly the leg seemed all right, yet as he continued walking, and especially if he tried to walk at all quickly, it failed him. It became more and more flexed at the hip, and the knee, and the ankle, so that it could not be straightened when it was put forward to take his weight, but as he bent forward to put his weight on it the foot came back almost to the position of the right foot. Then he had to lean over on his bent left leg and throw his right leg forward, and lean over on that and swing the left forward again as far as he could, but as it was so bent and stiff he could not reach the ground with it unless he bent his right knee and hip. The only discomforts he felt were an aching in the left tendo Achillis and fatigue in the back. Unless he was very careful to watch this flexed left leg in walking he would be thrown, especially if he was carrying a heavy weight. For eight years he had been a fettler. His work was to clean iron-castings taken from the moulds, chip off projecting pieces of iron, and then polish them on an emery wheel. Some of these castings were 18 kilogrammes in weight and nearly a metre in width, and as the wheel was low he had to stoop down, flexing the hip and knee and foot, and carry the castings from just in front of him to a point considerably to his left, so as to grind the one-metre edge. This threw the whole weight on the bent left leg, while the right leg was in a position of abduction to the right and carried almost no weight. If he walked on the heels and kept the soles off the ground (which could only be done with the knees stiff) the leg was not thrown into spasm, and if he walked on the balls of the toes and kept the heels off the ground he did not get the stiff flexion. But directly he tried to walk in the ordinary way this came on. By fixing a back splint from the upper part of the thigh to the lower part of the leg, and so preventing flexion at the knee, walking was made somewhat easier and less uncertain, but the spasm was still present and resistance to flexion was fatiguing.

Occupation neuroses usually affect the upper limb. In addition to the well-known writers' cramp there is the cramp of pianists, violinists, flautists, milkers, seamstresses, tailors, cigar-rollers, telegraphists, diamond-cutters, and barbers. Dancers in ballets get a cramp of the calf, as do also treadle-workers, but the conditions are usually transient. No doubt the reason that the occupation neuroses affect the upper limb so much more frequently is that they are always concerned with skilled movements repeated at intervals, and such movements are obviously more commonly executed by the upper limb.

ARTIFICIAL SUNLIGHT.

WITHIN the last few years the therapeutic value in surgical tuberculosis of exposure to sunlight has become established, owing a good deal to the practice of Rollier of Leysin. Except in southern climates, however, or those of the high Alps, where the sun shines strongly throughout the year, winter causes an inconvenient interruption to the treatment, which generally needs to be of long duration. Accordingly attempts have been made to substitute for the sun's rays, when absent, an artificial light, employing until recently that furnished by the mercury-quartz vapour lamp. The results have, on the whole, been inferior to those obtained by natural heliotherapy, and in several communications lately the carbon arc light is mentioned as being preferable, it is conjectured as exerting greater penetrative power. Some workers at the Finsen Medicinal Light Institute, Copenhagen, have reported[1] on the subject. Reyn and Ernst summarise their experiences as follows: (1) The carbon arc light can satisfactorily replace the sun-bath; (2) light alone without other clinical means can cure surgical tuberculosis; (3) light baths are a valuable mode of treatment in lupus; (4) the carbon arc light is better for the purpose than the mercury-quartz, and should alone be used whenever possible. The varieties of surgical tubercle treated comprised lupus, favourable results being claimed in cases resistant to other measures alone, and tubercle of lymphatic glands, of bone and joint, of the peritoneum, and of soft tissues. The last-named lesions responded best. As a rule, ordinary surgical measures seemed to be combined with the light treatment, which was not directed only to the site of disease, but generally to the surface of the whole body. Other workers (Mol in Holland and Collin at a Danish sea bathing hospital) supplemented the carbon arc illumination

[1] Hospitalstidende, 1917, Nos. 19, 20.

with ordinary incandescent lights, claiming that the higher temperature obtained increased the skin reaction. As in natural heliotherapy, pigmentation is deemed a favourable sign. Seventy-five ampères are mentioned as a suitable strength of current. With the winter months upon us, and at a time, too, when tuberculosis of all kinds, unfortunately, is rife, it might be well for this form of treatment to be tried here more than is at present the case. Little more than a year ago, indeed, the number of therapeutic mercury-quartz lamps in this country could be counted on one's fingers.

THE PRELIMINARY EXAMINATION OF THE ENGLISH CONJOINT BOARD.

THE Royal Colleges of Physicians of London and Surgeons of England have revised the Regulations relating to the Preliminary Examination required for the Diplomas of the Colleges. Under the new conditions Latin is now an optional subject, and a larger range of optional subjects has been adopted. A candidate must pass in: (*a*) English; (*b*) Mathematics; (*c*) one of the following languages—Latin, French, Russian, German, Italian, or Spanish; (*d*) a second language selected from the foregoing list or one of the following subjects—Higher Mathematics, Experimental Mechanics, Chemistry, Physical Geography, Physics, Botany, Biology, Geology. The revised Regulations come into force at once.

THE WHITEHALL RECRUITING CASE.

AFTER a prolonged ordeal of preliminary inquiry and trial at the Old Bailey Dr. A. M. R. Sinclair, a medical practitioner, was recently acquitted of the serious charge of conspiring to defeat the provisions of the Medical Services Acts in connexion with the passing or rejecting of recruits for the Army. In summing up to the jury Mr. Justice Salter pointed out that Dr. Sinclair bore a high character and had a good practice, and that there was no motive to cause him to take part in any conspiracy. He had received none of the money supplied by the military authorities and none from the man Grantway, who was afterwards convicted. There was no evidence, his lordship said, that Dr. Sinclair had ever classified a recruit unfairly or even incorrectly. As Mr. Justice Salter, at the conclusion of the evidence for the prosecution, had directed the jury to acquit one of the other men charged, it may have been wondered by some why he did not take a similar course in the case of Dr. Sinclair. The legal reason for this was sound and the course worked to the advantage of Dr. Sinclair, as was no doubt intended. By allowing the case of Dr. Sinclair to go to the jury the opportunity was given to explain or contradict things given in evidence which might otherwise have left Dr. Sinclair under some suspicion. By accepting Dr. Sinclair's evidence in his own defence, as it is clear that his lordship did, a full establishment of innocence was secured. Dr. Sinclair not only denied the charge, but he defied the War Office to produce a single recruit wrongly classified by him, and declared his own independence in examining the men fairly, in spite of an apparently official suggestion that all should be passed and dealt with later by the army surgeons who might attend them. Dr. Sinclair is to be congratulated on complete exoneration from a degrading charge, and will have everyone's sympathy in a grave ordeal.

THE DIGESTIBILITY OF BREAD MADE FROM TWO PARTS OF WHEAT AND ONE PART OF OATS, BARLEY, MAIZE, OR RICE.

BY E. I. SPRIGGS, M.D., F.R.C.P.,
AND
A. B. WEIR, B.Sc.
(*From the Duff House Laboratories*).*

THE proposition that barley, oats, maize, and rice are good human foods really needs no scientific defence, for the history of mankind relates that nations have been fed upon each of these varieties of corn; also our modern knowledge of their composition and many experiments tell us that they can supply the place of wheat in a mixed diet.

The measures taken by the Government to make good the lack of wheat by the use of other kinds of corn have, nevertheless, called forth some complaints. The mass of our people did not realise before the war that the cereals given to animals are good human foods; and did not know that by eating oats, barley, or maize ourselves we can get from them several times the food value that is obtained by turning them into beef or pork. The enormous amount of food which can be thus made available is shown by the figures of Professor T. B. Wood,[1] who calculated that of nearly 17 million tons of various kinds of corn used in this country before the war only 5 millions went for human food. This is less than the average production of home-grown corn, which amounted to 6½ million tons.

In an article written for the Ministry of Food in the spring of this year[2] the use of a mixture of barley flour, oatmeal, rice flour, or maize flour with wheat flour for making bread at home was suggested by one of us, in the proportion of one part of the meal to two parts of wheat flour or war flour. This is a higher proportion than has hitherto been used by millers in diluting wheat flour. The experiments here described were made to determine the digestibility of the bread so prepared.

These observations have no direct bearing upon the relative advantages or disadvantages of grinding into flour a larger or smaller proportion of the wheat grain. A good deal of work has been done on that subject, and was summarised up to the year 1911 in the valuable report by Dr. J. M. Hamill[3] to the Local Government Board. His conclusion was that "so far as relates to available or 'digestible' protein and energy ..... the differences in nutritive value between different grades of flour made from the same wheat are usually insignificant when compared with the differences in nutritive value of flours made from wheats differing widely from one another in composition."

The Diet.

In our experiments we intended to have used a Government regulation wheat flour milled to yield about 80 per cent. of flour, but we were unable to obtain a certified sample of this, and therefore used a pre-war white flour for the basis of our breads, to which the other cereals were added.

In many researches upon the assimilability of different foods the food concerned has been given in such large quantities as to form the greater part or the whole of the diet. This method is capable of great accuracy, but the results obtained do not always apply when the same food is eaten with a mixture of others. Our object was to find out what changes, if any, took place in the proportion of food assimilated from an ordinary mixed diet when wheat was replaced by a moderate amount of other cereals. The use of a mixed diet brings in sources of error. We have, however, special facilities for giving the same food day by day, as our staff is accustomed to the preparation and accurate weighing in grammes of many different foods.

For the present purpose those foods were chosen which could be had in as constant a form as possible over a period of several weeks, and the subject of the experiment deter-

* A summary of the experiments here described in detail was contributed to the discussion on War Bread, held at the Medical Society of London on Monday, Oct. 8th. (See THE LANCET, Oct. 13th, 1917, p. 572.)

mined for himself beforehand what dishes he preferred and would find least tedious when repeated over the same period. Each day's food was prepared under the personal supervision of one person, who also made the bread. The quantities of flour used were weighed out in the presence of one of us.

The diet was as follows:—

Breakfast: 2 eggs; butter, 20 grammes; bacon, 40 g.; marmalade, 30 g.; cocoa, 250 c.c., from 14 g. of cocoa; milk, 100 c.c.

Lunch: Fillet of beef, 112 g.; potato, 56 g.; cabbage, 56 g.; rice pudding, 130 g.; tinned pears, 200 g.; butter, 10 g.; cream, 20 g.; black coffee.

Tea: Butter, 20 g.; jelly, 20 g.; milk, 100 c.c.; cocoa, 250 c.c., from 14 g. of cocoa.

Dinner: Clear soup, 250 c.c.; haddock, 174 g.; butter, 20 g.; cheese, 42 g.; coffee, 250 c.c.; milk, 100 c.c.

The eggs were chosen of the same size. The same cheese, marmalade, and jelly were used throughout. The ingredients of the rice pudding were weighed every time. The soup was made in exactly the same way each day.

Of these foods parts equal to those eaten were taken and, after mincing when necessary, the whole mixed and analysed. The analysis gave:—

	Grammes.			Calculated calories.
	Protein.	Carbohydrate.	Fat.	
Determined	98	117	169	2461
Estimated from tables	112	106	153	2302

The value of the diet as estimated from analyses of cooked foods is placed beneath for comparison. With the above diet a loaf of bread, weighing about a pound, was eaten daily. When the bread was added the diet gave just under 4000 calories per day, or about 65 calories per kilogramme for our subject. Of this total food value about 38 per cent. was in the form of bread.

The bread was prepared as follows. The day before an experiment began 26¾ oz. of the white floor used was weighed out and mixed with 13½ oz. of the meal or flour to be tested, giving 2½ lb. of the mixed flour. This was then made into bread with yeast as described in Chapter IX. of "Food and How to Save It,"[2] the dough being divided into three equal loaves. As each experiment lasted three days the whole of the flour weighed out was consumed.

The white flour used was a pre-war white Canadian spring flour; the oatmeal was described as fine Scotch oatmeal; the barley flour and the maize were supplied by Messrs. Strachan, of Aberdeen, and are described as finest sifted barley flour and finest sifted maize flour respectively.

The war flour tested for comparison was obtained through the kindness of Mr. Oscar Andrews, of Belfast. It is a mixture of 80 per cent. wheat flour, 10 per cent. maize flour, and 10 per cent. barley flour; the wheat flour being 83 per cent. of the wheat, the maize flour 80 per cent. of the maize, and the barley flour 65 per cent. of the barley.

The white and war bread resembled each other in taste, both being crusty appetising loaves. The oatmeal and barley bread were also good, and the rice bread was very nice indeed. The maize bread was heavy but had an agreeable taste, and the heaviness did not made it unpalatable. It may be mentioned here that similar oatmeal bread has been eaten for some months by a number of people under the observation of one of us.

Details of the Experiment.

All the analyses were done by A. B. Weir. Each figure is the mean of at least two concordant results. The carbohydrate was determined gravimetrically after hydrolysis with dilute sulphuric acid in an autoclave at 115° C. for one hour. The other analytical methods were as described in a former paper.[4]

Analysis of the flours used gave the following figures:—

	Protain per cent.	Carbohydrate per cent.	Ether extract per cent.
White flour	13·0	80·5	2·4
Oatmeal	12·5	74·1	7·3
Barley flour	8·1	83·0	1·7
Maize meal	8·7	82·5	4·2
Rice flour	7·9	84·7	0·5
War flour	10·9	81·7	2·1

From these figures the amount and composition of the food taken as bread in each mixture of two-thirds wheat flour and one-third oatmeal, barley flour, maize meal, or rice was easily calculated. It was thought better to estimate the food value of the total flour used than to analyse the bread, thus escaping the difficulty of being sure of getting proportionate parts of crust and crumb. A little of the food value of the flour is lost by fermentation to alcohol, how much we do not know; but it is only a small quantity and should be approximately the same in each experiment. The amount of yeast used was constant.

The subject of the experiment was a healthy young man of 9 st. 10 lb. (61·7 kilogrammes). He was working for 7 to 8 hours a day, and took exercise out of doors about two hours a day, walking, bicycling, and fishing. He had no indigestion, the appetite was good, and the bowels were open naturally every day.

The fæces corresponding to each kind of bread were separated by charcoal, which was taken at 6.45 A.M., at the beginning and end of each three-day period: it passed through the body in from 24 to 48 hours, a normal time. The total urine was collected and the nitrogen determined in order to ensure that no great variations in nitrogenous equilibrium took place.

In determining how much of the food material is lost in the fæces certain assumptions are made which, though not strictly true, do not invalidate the results of experiments done under conditions as far as possible identical. First, it is assumed that the ether extract of both foods and fæces is fat. Secondly, the nitrogen of the food and fæces is represented as equivalent to a corresponding amount of average protein. Thirdly, the nitrogen in the fæces is regarded as unassimilated nitrogen from the food, whereas a good part of it is contained in material cast off from the lining of the intestine, which may, however, be supposed to be fairly constant in health from day to day.

Results.

The following table gives the results obtained from each three days' experiment, expressed as grammes per day:—

Totals per Day (in Grammes).

	Nitrogen.	Carbohydrate.	Fat.	Calories.
White bread—				
Food taken	23·5	420·6	178·1	3987
Fæces	2·1	1·5	10·8	164
Food assimilated	21·4	419·1	167·3	3823
Oatmeal bread—				
Food taken	23·4	412·5	184·4	4011
Fæces	2·9	3·7	10·8	184
Food assimilated	20·5	408·8	173·6	3827
Barley-meal bread—				
Food taken	20·9	423·7	177·3	3961
Fæces	3·8	2·9	9·4	196
Food assimilated	17·1	420·8	167·9	3765
Maize bread—				
Food taken	21·0	423·1	180·4	3997
Fæces	2·8	5·7	8·6	178
Food assimilated	18·2	417·4	171·8	3819
Rice bread—				
Food taken	22·4	425·9	175·8	3965
Fæces	2·3	2·7	7·7	142
Food assimilated	20·1	423·2	168·1	3823
War bread—				
Food taken	22·2	424·2	177·0	3965
Fæces	2·5	4·4	7·7	154
Food assimilated	19·7	419·8	169·3	3811

The results can be compared more easily when expressed as the percentage of the total food taken which was assimilated in each experiment.

Percentage Assimilated.

	Nitrogen.	Carbohydrate.	Fat.	Calories.
White bread	91·0	99·6	93·9	95·9
Oatmeal bread	87·6	99·1	94·1	95·6
Barley bread	81·5	99·4	94·4	95·0
Maize bread	86·7	98·6	95·2	95·5
Rice bread	89·7	99·4	95·6	96·3
War bread	88·8	99·0	95·6	96·1

These figures show certain differences in the percentage absorption of nitrogen (or protein), which varied from 81 per cent. in the case of barley bread to round about 90 per cent. in the cases of white bread, rice bread, and war bread. The variations in the absorption of carbohydrate and fat are smaller; but it is remarkable that they appear to neutralise the effects of the nitrogen variations, for when the proportions of the total food values assimilated in each experiment are compared, as shown in the last column of the above table, they are seen to be almost identical, the lowest being 95 per cent. and the highest 96·3 per cent.

The percentage of food absorbed therefore in these six experiments, each with a different kind of bread, was almost

the same. The variation from the mean was less than 1 per cent.

As regards the effect on the bowels, part of the charcoal taken at 6.45 A.M. appeared the next morning in each case, and the rest was passed out the morning after, except in the rice experiment, when the final charcoal took two days to appear. In the case of oatmeal bread, rice bread, and war bread, the part containing the first charcoal was rather less solid. During all the rest of the experiment the fæces were formed and moderately hard.

Conclusions.

1. If properly prepared and baked, palatable breads can be made from a mixture of one-third of oatmeal, barley flour, maize flour, or rice flour, and two-thirds of wheat flour.

2. Experiment showed that each of these breads, when taken with a mixed diet, was, for the time of the observation and for this subject, as nourishing as the bread made from white wheaten flour.

References.—1. T. B. Wood: The National Food-Supply in Peace and War, p. 16, Camb. Univ. Press, 1917, price 6*d*. 2. E. I. Spriggs: Food and How to save It, chap. ix., H.M. Stationery Office, 1917, price 3*d*. 3. J. M. Hamill: On the Nutritive Value of Bread made from Different Varieties of Wheat Flour, p. 30. H.M. Stationery Office, 1911, price 3*d*. 4. E. I. Spriggs and A. J. Leigh: A Case of Pancreatic Insufficiency, p. 15, Quart. Journ. Med., vol. ix., 1915.

PARIS.

(FROM OUR OWN CORRESPONDENT.)

The Control of Typhoid Fever in the French Army.

RECENT statistics illustrate the progress made during the war in dealing with typhoid fever, and establish the excellent results obtained by the use of antityphoid vaccination. The figures for the first three months of the war, which are probably very incomplete, give 8191 cases with 3076 deaths—i.e., a mortality of 37 5 per cent.—the census of cases being certainly far short of the truth, taken as it was during a period of disorganisation. Later statistics doubtless give a truer idea of the facts. During the period Nov. 1st, 1914, to Oct. 31st, 1915, 87.618 cases with 8614 deaths were recorded; from Nov. 1st, 1915, to Oct. 31st, 1916, 17,656 cases with only 700 deaths. The frequency of typhoid was therefore five and a half times less during the second year of war than during the first, and the mortality more than twelve times less. These results are manifestly due to the general adoption of vaccination, which was not made compulsory in the army until March 28th, 1914, only some 125,000 men having been rendered immune by the fateful day of mobilisation, August 2nd. The first vaccine used immunised solely against Eberth's bacillus and it was not until later that vaccines were introduced against paratyphoid infection A and B, the significance of which was only slowly recognised. At the present moment the immunity due to vaccination is beginning to decline, and in view of the appearance of new cases among inoculated men the Service de Santé has recently decided to proceed to general revaccination. By the study of the statistics in periods of six months certain illuminating conclusions will be apparent. The first period, ending on April 30th, 1915, naturally shows the highest figures—viz., 58,014 cases with 7013 deaths, that is, a case-mortality of 15·3 per cent. From May 1st to Oct. 30th, 1915, vaccination having become more general and the provision of drinking water more abundant, the number of cases fell to 29 604 and of deaths to 1151, the case-mortality being thus 3·9 per cent. Compared with the first half-year, the frequency of typhoid has been reduced by more than one-half, while the mortality per 1000 men is seven times less. Vaccination against paratyphoid was then adopted and in the next following six months the frequency fell to 12,043 and the number of deaths to 302; from May 1st to Oct. 30th, 1916, the frequency was still further reduced, becoming almost negligible in May and June. Finally, from Nov. 1st, 1916, to Sept. 1st, 1917, the reduction continued; during these ten months there were only 2048 cases and 129 deaths. The number of vaccinations required to produce this result should be noted. The central laboratory of Professor Vincent at the Val-de-Grâce Military Hospital furnished 5.513,073 doses of vaccine. To gain an idea of the benefit resulting from this enormous labour it is calculated that if the frequency and mortality of typhoid had remained what they were at the end of 1914, the number of cases of typhoid fever would have exceeded a million, and the number of resulting deaths 145,000, leaving out of account the probable aggravation of the disease caused by long-continued fighting and by three hot summers. Not less convincing is a comparison of the sanitary condition of the French Army before the war according to the latest official figures (1911): the cases of typhoid and paratyphoid occurring in the armies at the front are now seven times less numerous, and the deaths eight and a half times fewer than in time of peace.

Iodide of Starch as an Antiseptic.

M. Auguste Lumière, of Lyons, has recently made interesting experiments with a new antiseptic which is said to be as powerful and as harmless for purposes of irrigation as Dakin's fluid. Iodide of starch is prepared by mixing in a litre of boiling water 25 gm. of soluble starch and 50 c.c. of a 1 : 1000 solution of iodine in potassium iodide. This fluid, which contains in the litre 50 cgm. of iodine in a state of extreme division, is not irritating to the integuments, and has no effect on the linen or bedding. It is used in the same manner as Dakin's fluid, to which its antiseptic power is equal, while it is a much simpler preparation.

The Suppression of Iodism by Adrenalin.

Dr. Milian has succeeded in avoiding the unpleasant effects such as lacrymation, conjunctivitis, œdema of the lids, swelling of the face, and salivation, produced in many patients by the administration of potassium iodide. For this purpose he employs adrenalin, in a dose of 6 mgr. a day, in two doses. In several patients who showed complete iodide intolerance the symptoms disappeared in 24 hours and it was possible to continue treatment without provoking them afresh. He has used the same method to combat the reactions provoked by arsenobenzol.

Nov. 3rd.

CANADA.

(FROM OUR OWN CORRESPONDENT.)

Annual Meeting of Canadian Public Health Association.

The Prevalence of Venereal Diseases.—An outstanding discussion at the annual meeting of the Canadian Public Health Association, held in Ottawa on Sept. 27th and 28th, was opened by Captain Gordon Bates, C.A.M.C., Toronto, with a paper prepared in collaboration with Captain Morris McPhedran, C.A.M.C., and Captain Donald Fraser, C.A.M.C., upon the incidence of venereal disease. They contrasted the efficiency with which this menace is dealt with in the Army and the comparative indifference of civic authorities, pointing to the periodical inspection in the former, and the possibility of quarantine, a trustworthy weapon not to be obtained in civilian life. The paper outlined a recent investigation extending over four months, in which 417 cases were analysed, showing that 70 infected men were under 20 years of age, 144 between 20 and 25 years, some 260 being single men and 36 married. In 127 cases of infection there had been no payment of money to the woman, and only 44 women were classed as professional prostitutes. In the majority of the cases the women were working in poorly-paid occupations, such as domestics, sales-women, waitresses, and theatre ushers. In 295 cases the influence of alcohol was denied, and in 97 cases either the man or woman, or both, had indulged to excess. In 60 cases the infection took place in the girl's boarding-house, while in 119 cases infection took place out-of-doors. Emphasis was placed on the alarming prevalence of these diseases in almost every community in Canada; gonorrhœa was responsible for 10 per cent. of the blindness of the Dominion; many surgical operations were rendered necessary through it; many chronic diseases were caused by it. Syphilis was the cause of 35 per cent. of insanity in the country, while it was also one of the causes of mentally defective children. Diseases of the heart and blood-vessels were common sequelæ. Dr. Bates strongly urged that steps be taken immediately to facilitate early diagnosis and prompt treatment of all cases. Clinics, he said, should be established, not only in the large cities, but all over the country; treatment must not be quickly discontinued; and early marriages, which often resulted in innocent infection, must be safeguarded. Venereal diseases should be quarantined, and a law passed in Canada similar to that of Western Australia.

Immigration problems.—The first morning session of the meeting was given over to a discussion on the various diseases which the Army Medical Corps had to contend with in all branches of Army life. The President of the Association, Dr. J. D. Page, medical officer, Immigration Hospital, Quebec City, dealt principally with the immigration problems of Canada as compared with those of the United States. He spoke of the more effective system in vogue in the United States of holding responsible for the class of immigrants brought to the country the steamship companies, whose proprietors were fined without discrimination. The Canadian Government, he said, should recognise the necessity of a Public Health Department, but they would only do so when public opinion proved strong enough to bring about the desired result, and the Canadian people still seemed to be very indifferent about public health matters, as was evidenced by the small audiences which attended any public health gathering. The present was the time to prepare for the immigration problems which would force themselves upon Canada stronger than ever after the close of the war.

Patent medicines and alcohol "medicines."—Dr. Charles C. J. O. Hastings, medical officer of health of Toronto, said that many "cures" on the market contained an excess of drugs and alcohol, the latter particularly since prohibition had gone into effect in most of the provinces of Canada. The consumption and cancer "cures" which were being sold were robbing the victims of the only chance they had of recovery. The manufacturers of such concoctions were criminals of the worst type. He advocated health insurance for Canada on the plan adopted in England, and demanded that the Canadian Government should take immediate action.

Child Hygiene.—Dr. Alan Brown (Toronto), in charge of the Child Hygiene Department of the Toronto Board of Health, read a paper deploring the fact that Canadian mothers did not do their duty in respect to maternal nursing. He quoted statistics to prove that the women of the United States and many foreign women were 50 per cent. ahead of Canadian women in that respect. He considered that the State had not yet shouldered its responsibility in this regard. He pointed to the awakening of European countries since the war and stated the British infant mortality rate had been reduced since 1915 by about 10 per cent. Speaking of the beneficial effects of milk depôts and clinics, he pointed out that if such work was to be effective from a national standpoint, a milk depôt should be established for every 20,000 inhabitants.

The Need for Caution in Medical Journals.

Through the Assistant Director of Medical Services in Military District No. 2 (Toronto) the attention of those concerned has been called to a breach of military etiquette which has occurred. Heretofore, articles on medical and surgical topics connected with the war have been appearing in some of our medical journals. The medical officers who are the authors of these papers have apparently been overlooking the fact that, not only by the King's regulations and orders for the Army, but also by special orders issued by the British Expeditionary Forces, of which the Canadian Expeditionary Force is a part, they are forbidden to communicate such papers without securing in advance consent for publication from the Director-General of Medical Services. In future all articles on medical or surgical subjects connected with the war must be submitted to that official.

Canadian Medical Officers for the War.

Under the selective draft system of the Canadian Military Service Act (1917) Canadian doctors of military age will be divided into three classes according to their physical fitness: Class A, who would go overseas; Class B, who would be posted for duty probably in England or at one of the Canadian camps; and Class C, who would serve on the staffs of hospitals in Canada. Forty-eight years was the extreme age-limit for home service, and 45 years for service overseas. Physicians over age might be attached to Canadian military hospitals as consultants. Recently the College of Physicians and Surgeons of Ontario appointed a special committee to take a census of the medical men in the province. This requires the names of all medical men, whether of military age or not. The register of Ontario contains the names of about 3100 physicians, and over 500 of these are overseas or in service at home.

Oct. 20th.

Correspondence.

"Audi alteram partem."

THE DISTRIBUTION OF BLOOD IN TRAUMATIC SHOCK.

To the Editor of THE LANCET.

SIR,—At the present moment much attention is being paid to the study of traumatic shock. It has been commonly stated and apparently accepted by many that this condition is in some way connected with an accumulation of blood in the capacious splanchnic area. The acceptance of this conception has considerably affected the views of some workers on this question, and has probably influenced to some degree the attempts that have been made to elucidate the problem.

A statement of a considerable clinical experience may conceivably be of use at the present moment. We would, therefore, state that in the course of many hundreds of abdominal operations undertaken upon patients in all degrees of traumatic shock we have not found any primary splanchnic congestion to exist. When the abdominal contents have been exposed to an atmosphere for any prolonged period, or when inflammatory processes have been established, a secondary vascular dilatation exists, but we can see no ground for the assertion that a primary dilatation of blood-vessels in the splanchnic area occurs.

We are, Sir, yours faithfully,

CUTHBERT WALLACE,
JOHN FRASER,
HAMILTON DRUMMOND.

Oct. 1st, 1917.

THE GERMICIDAL POWER OF FLAVINE.

To the Editor of THE LANCET.

SIR,—Commenting in your issue of Oct. 20th on my note on the germicidal potency of flavine, Dr. C. H. Browning mentions that comparisons with other antiseptics are not given. As a matter of fact, such comparisons were made in some instances, with the following results:—

Experiment 1 (Inhibitory power of flavine on development of *B. perfringens* group in milk).

Carbolic acid 1:666 = No growth.	Bacterol 1:1600 = No growth.
,, ,, 1:1000 = Growth.	,, 1:2000 = ,,
	,, 1:2660 = Growth.

Experiment 2 (Germicidal power of flavine on *Staphylococcus* in broth).

Carbolic acid 1:133 = No growth. (Not carried lower.)	Kerol 1:5000 = No growth.
	,, 1:10,000 = ,, (Not carried lower.)

Experiment 3 (Same as No. 2, substituting saline for broth).

Carbolic acid ... 1:133 = No growth.
,, ,, ... 1:200 = ,,
(Not carried lower.)

Experiment 6 (Pus).—Bacterol 1:200 = No growth (not carried lower).

Dr. Browning objects to the use of pus for disinfectant tests because: (1) it is inconstant in composition and the results obtained with it vary enormously, and (2) the surgeon does not treat infected wounds by mixing an antiseptic with the pus contained in them. Since my note was published I have tested another staphylococcic pus. Results:—

Flavine 1:500 = No growth. | Flavine 1:1000 = Growth.

My two experiments with pus indicate that flavine 1:1000 does not kill; Fleming states that the germicidal power of flavine on staphylococcic pus lies between 1:500 and 1:1000. Here, at any rate, are several fairly concordant experiments. With regard to Dr. Browning's second point, I might equally say that the surgeon does not use his antiseptic mixed with peptone water or serum—the media employed by Dr. Browning in his experiments. The fact is, of course, that any medium used is a compromise, and does not exactly reproduce the conditions obtaining in an infected wound. On the whole I should be inclined to place most reliance upon results obtained with pus, if possible taking a mean value for a number of tests.

I am, Sir, yours faithfully,

Chandos-street, Strand, Nov. 6th, 1917. R. TANNER HEWLETT.

NASO-PHARYNGEAL INFECTION AT THE ONSET OF CEREBRO-SPINAL FEVER.

To the Editor of THE LANCET.

SIR,—In an interesting communication to THE LANCET of Oct. 20th, in which they record the fact that of 26 men who subsequently developed cerebro-spinal fever all gave a negative naso-pharyngeal swab when examined from 2–65 days before the onset of the disease, Staff-Surgeon P. Fildes and Surgeon S. L. Baker express the opinion that this observation is not in harmony with a previous statement of mine upon this subject. This I venture to point out is a misunderstanding.

In summarising the observations which had been made by Captain M. W. Flack when acting as officer in charge of the London District Cerebro-spinal Laboratory, in the report to the Medical Research Committee to which they refer, I drew attention to the particularly careful investigation made by him of cases at the onset of the disease, and remarked that his detection of the meningococcus in the naso-pharynx of the patient at the onset of symptoms in practically all his cases—including instances where at this early stage of the attack the meningococcus was not to be obtained from the cerebro-spinal fluid—went to show that every case of cerebro-spinal fever was in reality an instance of a carrier developing the disease. By this I never meant it to be understood that the carrying of the meningococcus by the patient in his naso-pharynx had been of a *chronic* nature. Contrariwise, the evidence in Captain Flack's and Captain Tulloch's reports in the same volume, and the general experience, both before and since, in outbreaks among the military, is to the effect that it is comparatively rare for chronic carriers to develop the disease themselves.

The fact recorded by Staff-Surgeon Fildes and Surgeon Baker, so far from contravening the view I took, and take, of this matter, is what I have always suspected to be the case in, at any rate, a considerable proportion of those who contract the disease.—I am, Sir, yours faithfully,

Central C.S.F. Laboratory, Caxton-street, S.W., Oct. 20th, 1917. M. H. GORDON, Lieutenant-Colonel, R.A.M.C.

THE BIOLOGICAL ASPECTS OF WARFARE.

To the Editor of THE LANCET.

SIR,—Dr. Harry Campbell's articles on this subject in recent issues of THE LANCET are, as his articles are usually, in keeping with the best thought of our day, but he and others have considered too little the biological aspect of the present war. A valuable book by Dr. Chalmers Mitchell on Evolution and the War was published in 1915, and there was a short correspondence last autumn in the *Saturday Review* on Biological Necessity, as it presented itself to the German mind. But except for these I have seen little reference to the unscientific claim of German scientists that the war which the Germans forced upon the world was a matter of biological necessity, based upon the assumption that their particular empire must expand. This audacious claim of the professors is silent now, but it lies at the very root of the causes of the war. Now, either these State-paid men, learned more than wise, have badly learned their Darwinism, or they are more treacherous than their European colleagues were wont to think in pre-war times. I prefer to think that Prussian ignorance of the mind of the world around them has led to this claim, and that the crafty advisers of the Kaiser have availed themselves of the simplicity of tame professors. The plea of necessity is good enough for tyrants, but in the kingdom of nature there exists no necessity that one group of animals in their efforts to expand should trample down other groups. The struggle for food and mates is not between Carnivores and Ungulates, between Felidæ and Ursidæ, or Bovidæ and Equidæ, but between individuals of the same species, all the great groups living side by side in a state of armed neutrality. Pithecanthropus may be superseded by Eoanthropus, and Neanderthal man by modern man, during a whole geological period, and the Aztecs and Incas be overwhelmed in a few years by a handful of Spaniards; but such events afford not the slightest parallel to the biological necessity claimed by Germany. Though the Felidæ be at once the strongest, fiercest, and most cunning of the Carnivores they find their existence depends on keeping to their habitat, and even in their own family circle the lions and leopards have not crushed out the panthers and lynxes. But our Felidæ of Europe set up some loud-voiced Treitschke, and on his authority declare to the world that now, and precisely in 1914 of the Christian era, the time has come for them to succeed where Charlemagne, Spain, and France failed; that Germanism shall now prevail—because it must! The answer of thirteen hundred millions of men to this claim of some hundred and fifty millions can surely be only that of Nature, "not a word and a blow, but a blow alone." Indeed, the rest of the civilised world does not see the necessity that a German Empire, as such, should exist at all.

I am, Sir, yours faithfully,

Nov. 4th, 1917. WALTER KIDD, M.D., F.R.S.E.

THE TREATMENT OF ENURESIS.

To the Editor of THE LANCET.

SIR,—Gradual dilatation of the bladder can usually be effected in a much simpler manner than by using the catheter. When the child wishes to micturate make it hold its water while sitting quietly in a chair. It may be at first only able to hold it for half a minute, but in two or three weeks the child can often do so for ten minutes. It means, of course, a great deal of trouble for the mother or nurse, but it saves all the objections to passing a catheter somewhat frequently, and will get the bladder accustomed to a full charge.

I am, Sir, yours faithfully,

Ingatestone, Oct. 31st, 1917. SHEFFIELD NEAVE.

To the Editor of THE LANCET.

SIR,—The reference to a surgical method of treatment of enuresis tempts me to refer to a medical method which is not so well known, I think, as it might be. Dr. Edmund Cautley mentions that "mere change of surroundings, such as admission to a hospital ward, is sometimes sufficient to break the habit." The habit may also very frequently be broken by the administration of sulphonal. I give a dose of sulphonal, containing about 1 grain for each year of the child's life, every night for the first week, every other night for the second week, and every third night for the third week. In a considerable number of cases the child is permanently cured. There may be some return a few weeks or months later, when the treatment can be successfully repeated. In some cases in which administration of sulphonal is not successful, it has occurred to me that success might attend larger doses. Sulphonal, however, is a drug which one uses with caution. At one time I tried trional in its place, but the results were very disappointing.

I am, Sir, yours faithfully,

Norwich, Oct. 31st, 1917. THEODORE FISHER.

To the Editor of THE LANCET.

SIR,—The correspondence in your columns on the treatment of enuresis prompts me to point out that, so far as my personal experience is concerned, this condition, when not dependent on organic disease, is one of the most favourable for treatment by suggestion. As a rule hypnosis is not required and few treatments are necessary.

I am, Sir, yours faithfully,

Harley-street, W., Oct. 31st, 1917. E. L. ASH.

CARDIAC DIGITAL PERCUSSION.

To the Editor of THE LANCET.

SIR,—I have read with very great interest the article in THE LANCET of Oct. 20th, by Dr. W. Gordon and Mr. C. E. W. Bell, on the above subject, and I entirely agree with them as to the striking changes produced in digital cardiac dullness by change of posture from erect to recumbent. There is no doubt that the importance of percussion in the correct diagnosis of various cardiac conditions is not fully appreciated. It is not possible, in my opinion, to make a correct diagnosis of the state of a heart without the use of careful cardiac percussion, and if this percussion is only done in the recumbent position, it is equally impossible to arrive at a correct diagnosis as to the presence and degree of cardiac enlargement, especially enlargement due to dilatation of the auricles. Personally I always rely upon the deep cardiac dullness, as what is termed the "super-

ficial cardiac dullness" is variable and difficult to map out correctly, and therefore, as the authors of the article mention, of no practical use. What is known as the "normal" cardiac dullness varies in almost every individual according to the shape of the chest and the condition of the lungs; consequently every patient with a normal heart has a normal cardiac dullness of his own, though that dullness is always within certain limits. When a patient is in the recumbent position the area of cardiac dullness is decidedly reduced, as compared to that of the erect position, especially toward the right side; and it is therefore impossible to diagnose slight auricular dilatation if the patient is only percussed in the prone position. This I believe to be the reason it is often overlooked. There is also no doubt, as the authors of the paper state, that many medical men use faulty methods of percussion, and I fear this condition of things will rather increase than decrease as students are often taught to rely entirely upon the polygraph or electrocardiograph and the stethoscope for diagnostic purposes.

On more than one occasion I have drawn attention to the fact that medical men who attempt to make a full and accurate diagnosis of a cardiac case entirely upon evidence obtained by the aid of the electrocardiograph or the polygraph and the stethoscope, will fail to do so. The doctor who wishes to make as accurate a diagnosis as possible must use the polygraph, the sphygmomanometer, and the stethoscope, and must also percuss the heart out carefully, both in the erect and prone position; if he fails to use one or more of these aids to diagnosis he will probably fail in his diagnosis.

I am, Sir, yours faithfully,

Harley-street, W., Oct. 20th, 1917. LESLIE THORNE THORNE.

SUCCESS AND FAILURE IN THE TREATMENT OF TUBERCULOSIS.

To the Editor of THE LANCET.

SIR,—You are wrong in including me amongst those who have only realised that the anti-tuberculosis methods were inadequate since the publication of the figures for 1916. In my paper, "The Prevention and Treatment of Pulmonary Tuberculosis," published in the *British Medical Journal* in 1912, I quoted Karl Pearson's statistical conclusions, which showed the steady retardation in the fall of the tuberculosis death-rate since 1895. Professor Pearson kindly brought his diagrams up to 1915 for my book, "Pulmonary Tuberculosis," published early this year, which confirmed his previous conclusions.

I am sure the general mechanism of the Edinburgh scheme is sound enough, but I can no more think that it can be successful without an efficient method of treatment than I can think a steam-engine of any use without steam.

I am, Sir, yours faithfully,

Dublin, Oct. 30th, 1917. W. M. CROFTON.

*** Dr. Crofton's letter placed him among those who saw in the present increased incidence of tuberculosis evidence of failure in our anti-tuberculosis methods, but we expressed no opinion as to how long he had held this view.—ED. L.

WAR DEAFNESSES.

To the Editor of THE LANCET.

SIR,—In the current number of the *Journal of Laryngology, Rhinology, and Otology* there is an article by Dr. W. Sohier Bryant, a well-known New York oto-laryngologist at present serving with the French Army, on "The Prevalence of Ear Injuries and Diseases in the French Army," which merits the serious attention of the British Army medical authorities. According to the writer's experience the total number of sick in the evacuation hospitals of the *zone des armées* comprised no fewer than 16 per cent. of ear cases, a number equal to, or greater than, the figure for ophthalmic disease. In addition to these numbers, which naturally only include those men who report sick, there are, it is estimated, still remaining at the front at any period an equal number of men who bear the loss of their hearing without complaint, besides such cases as are severely wounded in other regions, and in whom on this account the ear injury is overlooked.

It should be noted that while war injuries of the labyrinth are difficult of treatment and of cure, such injuries as simple rupture of the tympanic membrane are easily and successfully treated when promptly taken in hand by an expert. On the other hand, neglect or delay in attending to this inherently trifling injury entails the onset of suppuration of the middle ear with all its evil consequences. The fact is, as Dr. Bryant notes, that modern war exercises its evil influence more on the hearing organ than on any other special sense, and for that reason, therefore, modern armies ought to be equipped with a sufficient body of specialists to cope with this unlooked-for development. Unfortunately, this does not seem yet to be the case, for, as he says, with the English-speaking allies, the organisation of the special service of oto-rhino-laryngology is still very weak, and thus many men must be lost both to the Army and to civil life who might otherwise be saved.—I am, Sir, yours faithfully,

Wimpole-street, W., Oct. 27th, 1917. DAN MCKENZIE.

A METHOD OF COLLECTING BLOOD SERUM.

To the Editor of THE LANCET.

SIR,—There is a simple and efficacious method of obtaining serum from blood which I have not seen referred to in the articles dealing with this matter in THE LANCET, and which in the absence of special apparatus can be easily carried out.

The blood is collected or run into a test-tube of ordinary size, 15 by 1·5 cm., to the amount of 2 or 3 c.c.; it is then allowed to clot in a sloping position. The sloped blood should extend as far along the side of the tube as possible so as to form a thin layer, and the tube should not be moved until the clot is firm, an hour or more, according to the temperature and other factors. The serum will sweat out in drops during the course of a few hours and run to the bottom of the tube, the clot finally drying down on the glass into a thin skin.

As a matter of laboratory routine where small amounts of blood are collected, as for the Wassermann reaction, and kept stored for a day or two before the test is carried out, this forms a most convenient method. It was shown me a year or two ago by Captain A. H. W. Caulfeild, C.A.M.C., and I have seldom known it fail to give a good supply of clear serum. My experience of blood sent by post in stout glass tubes, 12 × 1 cm., with rubber bungs, is that it arrives with a firm detached clot and an abundance of serum, which on standing a short time becomes perfectly clear. Presumably the shaking aids the detachment and shrinking of the clot in this case.—I am, Sir, yours faithfully,

T. H. C. BENIANS.

Prince of Wales's Hospital, Tottenham, N., Oct. 31st, 1917.

THE POSITION OF PRACTICE UNDER THE NATIONAL INSURANCE ACT.

To the Editor of THE LANCET.

SIR,—The leading article in THE LANCET of Oct. 27th with this title was interesting reading. Despite all the pros and cons, I do not think that the Act has been a blessing to a majority of medical men on the panel. The great mistake has been made of giving our prescriptions to pharmaceutical chemists to use wholesale for their own benefit in prescribing over the counter. Formerly a medical man would charge from 2*s.* 6*d.* to 5*s.* (and more) for a prescription; now one panel patient can have for 5*s.* 6*d.* a year half a dozen prescriptions. This is a state of things which those of our parents, who, being in medical practice, spent a lot of money at the London hospitals for our training in their profession, could never have dreamed of. Last winter I was called to see a lad with a severe cough and cold, and this lad's uncle informed me he got a cough mixture from the chemist. On seeing the mixture I found it to be the prescription I give to my panel patients. Cases where pharmaceutical chemists have prescribed for the public, and by so doing have caused the proper time for scientific interference to be fatally put off, are known to all of us.—I am, Sir, yours faithfully,

Cheltenham, Oct. 29th, 1917. ARTHUR E. PRICE.

THE governors of the West Ham Municipal Central Secondary School propose to call the institution "The Lister School," to perpetuate the association of Lister with the borough.

THE University of Leeds has received with great regret the resignation by Professor A. S. Leyton of the Chair of Pathology and Bacteriology in the University, and has recorded its high appreciation of the valuable services rendered by him during his tenure of the chair.

Obituary.

SIR DAVID CALDWELL McVAIL, M.B., F.F.P.S.GLASG., HON. F.R.C.P. IREL.,

CONSULTING PHYSICIAN TO GLASGOW ROYAL INFIRMARY; LATE CROWN MEMBER FOR SCOTLAND OF THE GENERAL MEDICAL COUNCIL.

WE learn with regret of the death at his house in St. James's-terrace, Glasgow, on Sunday last, of Sir David Caldwell McVail, his illness, acute pneumonia, only having extended over two days.

David Caldwell McVail was born in Kilmarnock 72 years ago and received his education at Kilmarnock Academy. Deciding to enter the medical profession, after a brief period of apprenticeship to a druggist, he proceeded to Anderson's College, Glasgow, and later became an undergraduate at the University. He obtained the Licentiateship of the Royal Faculty and also of the Royal College of Physicians, Edinburgh, in 1866, graduating later in medicine at Glasgow University. On qualification he went into practice for a time in the country, but shortly returned to Glasgow, and in 1887, having been admitted in the meantime a Fellow of the Royal Faculty, took up the post of lecturer on physiology in Anderson's College. From this time forward he became a leader in medical circles in Glasgow, chiefly because of his wide interest in the reform of medical education and later in general university reform, but it must be remembered that he was also a sound and learned clinician. He was a protagonist in the movement which resulted in the passing of the present Scotch Universities Act, and was personally responsible for many of the prominent features of a piece of legislation whose result has been the foundation of chairs and lectureships and the general raising of the standards of teaching and examination in Scotland. After resigning the lectureship of physiology in Anderson's College he assisted in the founding of the Western Medical School, Glasgow, and held there the lectureship in the practice of medicine. He was appointed dispensary physician to the Western Infirmary, and later he became professor of clinical medicine in St. Mungo's College, and finally physician to the Royal Infirmary, Glasgow.

As a matter of course McVail was regarded by the Royal Faculty of Physicians and Surgeons of Glasgow as a typical representative of their interests and of the cause of medical education generally on the General Medical Council, and from 1886, when the new Medical Act came into existence, to 1888 he represented the Faculty at the Council board; but in 1892 he was appointed to the Council as Crown Representative for Scotland, a position which he held for 20 years by successive reappointments until 1912. His interest in the work of the Council was unflagging. As a member of the Executive Committee, of the Committees on the Pharmacopœia, on Public Health, and on the National Insurance Act, and as chairman of the Examination Committee, he made his strong and keen personality a prominent feature in all the deliberations of that body.

In 1910, in due recognition of distinguished public work, McVail received the honour of knighthood. He had been a member of the Glasgow University Court at the time of his death for nearly a quarter of a century, and since the outbreak of war has been regularly engaged in professional work at two of the Glasgow hospitals. His life may therefore be said to have been passed in promoting the progress and scientific interests of his calling, and he died with harness on his back.

Sir David McVail married the daughter of a prominent Newcastle journalist and is survived by his wife, one daughter, and one son, who is a surgeon in the Colonial Service in Singapore. He was succeeded on the General Medical Council by his brother, Dr. J. C. McVail, vice-chairman of the National Insurance Commissioners in Scotland.

THE LATE DR. EDMUND F. T. PRICE.—Dr. E. F. T. Price, of Edinburgh, who died suddenly on Oct. 27th while drilling with the Volunteers at Corstorphine, was son of the late Dr. A. G. Price, civil surgeon in the Indian Medical Service, and was educated in India, taking his degree at Edinburgh University. He had done much X ray work for the Red Cross during the war. Dr. Price leaves a widow, a daughter, and three sons, two of whom are on active service with the Royal Army Medical Corps.

THOMAS TILLYER WHIPHAM, M.A., M.D. OXON., F.R.C.P. LOND.,

CONSULTING PHYSICIAN TO ST. GEORGE'S HOSPITAL.

WE regret to announce the death, at his residence, Fishleigh House, Hatherleigh, Devon, of Thomas Tillyer Whipham, consulting physician to St. George's Hospital, and for many years in consulting practice in Grosvenor-street, London.

Thomas Tillyer Whipham was born in 1839, the son of a barrister of Lincoln's Inn, and was educated at Rugby, Oriel College, Oxford, and St. George's Hospital. At St. George's Hospital he held in succession all the medical teaching posts in the school, and was elected assistant physician in 1872. In 1877 he became full physician after an unusually short time of waiting for promotion, and he was for a considerable period dean of the medical school. No member of a hospital staff could have more endeared himself to students. He was the best type of teacher, courteous, impressive, clear, simple, but well equipped to his fingers' ends. For years his demonstrations in clinical medicine were a feature in the training of the students at his hospital. He had charge especially of the throat department, and the notes of his experience in that capacity, published in the St. George's Hospital Reports, are those of a most careful clinician. In Volume VIII. of the same Reports will be found some interesting records from his pen of the early use of salicin and salicylic acid, and he contributed a few papers on laryngological topics to THE LANCET; but he wrote very little, and was only an infrequent speaker at the medical societies. He examined in medicine at Oxford and also at the English Conjoint Board, and served as Senior Censor to the Royal College of Physicians of London. He was also physician to the Legal and General Life Assurance Society and a member of the Court of Assistants of the Goldsmiths' Company. He was elected consulting physician to the hospital which he had served so well in 1897, and later retired from practice and went to live in the country, having always been a devoted adherent to county sport.

He married Florence, daughter of Mr. Charles Tanqueray, by whom he had one son, Dr. T. R. C. Whipham, physician to the Evelina Hospital for Children.

WALTER FOWLER, M.A., M.B., B.C. CANTAB., F.R.C.S. ENG., L.S.A. LOND.

THE death is announced at Bendigo, Australia, on July 26th, of Dr. Walter Fowler, at the age of 59. He was the son of the late Dr. Robert Fowler, of Bishopsgate-street and Old Burlington-street, London, and commenced his medical career by winning in 1876 the Tancred studentship in medicine, held at Gonville and Caius College, Cambridge. After graduating at Cambridge in Arts he proceeded to Guy's Hospital, from which medical school he qualified in 1883, afterwards holding the appointment of house surgeon. In 1884 he took the Fellowship of the Royal College of Surgeons of England, and in the following year commenced practice in Birmingham, being appointed outpatient surgeon at the Queen's Hospital. On the death of his father in 1886 he returned to London to carry on the general practice in the City, holding an appointment also at the Central London Throat and Nose Hospital, where he assisted the late Mr. Lennox Browne. A breakdown in health led him to migrate to Australia, and after nine years' private practice in Echuca, Victoria, he was appointed resident medical officer to the Bendigo Hospital. Here his large surgical experience resulted in his becoming one of the leading surgeons of Victoria, and when ill-health forced him to retire in 1912 from the hospital, he was much missed as a kindly and efficient administrator.

In 1887 he married Alice M. Wacher, of Herne, Kent, who, with a family of two sons and one daughter, remain to mourn their loss.

ROYAL INSTITUTION.—A general meeting of the members of the Royal Institution was held on Nov. 5th, Sir James Crichton-Browne, the treasurer, being in the chair, when the special thanks of the members were returned to a lady member for an anonymous gift of £500 and to Mr. Richard Pearce for a donation of £100 to the Fund for the Promotion of Experimental Research at Low Temperature.

THE SERVICES.

ROYAL NAVAL MEDICAL SERVICE.

To be temporary Surgeons: A. McCallum, N. A. H. Barlow, M. H. Jupe, B. S. Collings, J. W. McK. Nicholl.

ARMY MEDICAL SERVICE.

Col. M. J. Sexton, C.B., is retained on the Active List under the provisions of Arts. 120 and 522, Royal Warrant for Pay and Promotion, and to be supernumerary.

TERRITORIAL FORCE.

Capt. (temp. Major) C. M. Fegen to be Deputy Assistant Director of Medical Services.

ROYAL ARMY MEDICAL CORPS.

Lieut.-Col. J. C. Connor, C.M.G., relinquishes the rank of temporary Colonel on re-posting.

The undermentioned relinquish the acting rank of Lieutenant-Colonel on re-posting: Major C. H. Straton, Capt. H. Gibson.

The undermentioned Majors retain the acting rank of Lieutenant-Colonel whilst in command of a Casualty Clearing Station: T. F. Ritchie, D.S.O., E. W. Siberry.

Capt. J. B. A. Wigmore to be acting Lieutenant-Colonel whilst in command of a Field Ambulance.

Temp. Major D. A. Whitton, Can. A.M.C., to be acting Lieutenant-Colonel while specially employed.

Temporary Lieutenants to be temporary Captains: H. Gooch, W. Turner, J. L. Lawry, E. M. Fannin, A. L. Saunders, S. Potter, T. W. G. Johnson, S. P. Bedson, A. Chance, C. W. Macpherson, T. H. Martin, M. J. Wilson, H. A. Whyte-Venables, M. R. V. Ford, C. J. R. Hoffmeister, W. Howat, A. W. Kendall, S. F. Fouracre, W. H. Duncan, R. J. B. Leney, S. F. Cheesman, M. J. Loftus, D. MacKinnon, W. J. Thomas, G. A. Crowe, G. C. Hartley, A. P. Piggot, C. Duncan, T. Clapperton, J. Goeghegan, C. T. M. Plowright, W. McAlpine, H. J. Simson, M. H. Laslett, H. Goodale, J. R. Anderson, S. H. Ryan, R. W. Nairn, S. A. Owen, T. B. Sellors, F. J. Spilsbury, D. C. P. Taylor, C. J. N. Longridge, A. L. Saunders, H. C. Burbidge, E. V. Dunkley, F. Anderson.

V. M. Fisher, late temporary Captain, is granted the honorary rank of Captain.

Temp. Lieut. J. M. Ahern, late Surgeon Captain, Liverpool Regiment, Volunteers, to be temporary Captain.

R. B. Lilly, late temporary Captain, is granted the honorary rank of Captain.

Officers relinquishing their commissions: Temp. Capts. W. S. Allan, J. Lindsay, M. Polson, I. B. D'Oher, H. V. Drew, A. G. Bodman, J. I. Johnson, A. McC. Davidson, W. M. Will, J. B. Wood, J. F. McCracken, Can.A.M.C., C. W. Anderson, Can.A.M.C. Temp. Lieuts. J. Anderson, R. J. Scarr, G. Sciporiti, G. Elam, J. H. Stephens, W. Dunn, J. C. Nixon, R. W. S. Walker, S. Hutchinson, F. Rogerson, C. Murphy, J. C. Murray, W. J. Morrish, A. B. Ferguson, T. W. Walker, A. Spong, G. E. Macvie, G. M. B. Liddle, W. B. Harris, C. M. Kellor, T. G. Fenton, A. Falconer.

SPECIAL RESERVE OF OFFICERS.

Lieutenants to be Captains: G. K. E. Inman, J. K. R. Landells.

To be Lieutenants: Temp. Hon. Lieut. E. S. Phillips (from R.A.M.C.), W. D. Mackinnon (from Edinburgh University O.T.C.), E. J. Coombe, J. Berry, R. F. C. H. Buchanan.

TERRITORIAL FORCE.

Capt. (temp. Major) C. M. Fegen to be seconded whilst holding an appointment as Deputy Assistant Director of Medical Services.

Capt. (temp. Major) C. M. Fegen to relinquish his temporary rank on an alteration in posting, and to be restored to the establishment.

Capt. (temp. Major) G. A. Ewart relinquishes his temporary rank on alteration in posting, and is restored to the establishment.

Capt. A. C. O. Brown relinquishes his commission on account of ill-health.

Capt. G. L. L. Lawson to be temporary Major whilst in command of a Field Ambulance.

Capt. A. L. Flemming to be restored to the establishment.

Capt. H. H. Markham to be seconded for duty with a General Hospital.

Capt. L. A. Rowden, M.C., to be seconded for service with a General Hospital.

Capt. J. Pearson to be seconded for duty with a General Hospital.

Capt. W. I. Cumberlidge to be seconded for duty with a General Hospital.

Lieut. J. R. Clark to be Captain.

T. O. Scott, 11th Battalion, West Riding Volunteer Regiment, to be temporary Lieutenant and Medical Officer.

TERRITORIAL FORCE RESERVE.

Capt. (temp. Major) W. Tyson, from R.A.M.C., to be Captain.

Capt. A. G. Williams, from R.A.M.C., to be Captain.

Colonel Sir William Boog Leishman, C.B., F.R.S., K.H.P., has been appointed a Knight of Grace, and Major Thomas Houston and Major Charles William Menelaus Hope Esquires of the Order of the Hospital of St. John of Jerusalem in England.

At the annual meeting of the Society of Members of the Royal College of Surgeons of England held on Oct. 30th note was taken of the rejection by the College of the proposal made by the society not to hold this year the usual annual general meeting of Fellows and Members, in view of the fact that many of them are absent abroad on war service or busily engaged at home. It was unanimously decided to submit no resolution at the College meeting in November and to make no attempt to attend the meeting or to obtain a quorum there.

The War.

THE CASUALTY LIST.

THE following names of medical officers appear among the casualties announced since our last issue:—

Killed.

Capt. E. J. Kerr, Australian A.M.C.

Major G. R. C. Clarke, Australian A.M.C., qualified at Sydney in 1902, and was in practice at Wahroonga, New South Wales, prior to joining the Expeditionary Force.

Died of Wounds.

Capt. A. Z. Philips, R.A.M.C., qualified at Edinburgh in 1910, and held appointments at the Royal Southern Hospital and at the Children's Infirmary, Liverpool, at the Scarborough Hospital and Dispensary, at the Park Hospital for Children, Hither Green, Lewisham, and at the Florence Fiennes Hospital, Dunkirk.

Capt. D. J. S. Stephen, M.C., R.A.M.C., qualified at Aberdeen in 1910, and held appointments at the County Hospital and at The Lawn Asylum, Lincoln. He was in practice at Lincoln before joining the R.A.M.C. The award of the Military Cross was recorded in THE LANCET of July 31st, 1915, p. 257.

Capt. W. G. McConnell, R.A.M.C., qualified in Ireland in 1915, and joined up shortly afterwards.

Capt. W. Morrison, M.C., R.A.M.C., qualified at Edinburgh in 1909, and shortly afterwards joined the West African Medical Service. The award of the Military Cross was recorded in THE LANCET of Dec. 2nd, 1916, p. 958.

Wounded.

Capt. S. R. Gleed, R.A.M.C., attached Durham L.I.
Lieut. A. P. Draper, R.A.M.C., attached Lancashire Fusiliers.
Capt. R. D. Nasmyth, R.A.M.C.
Major W. R. Craig, Australian A.M.C.
Capt. P. S. Parkinson, Australian A.M.C.
Capt. J. Arthur, R.A.M.C.
Lieut. G. E. Lloyd, M.C., R.A.M.C.
Capt. W. J. Nisbet, R.A.M.C.
Capt. R. W. Ryan, R.A.M.C.
Surg. R. G. Morgan, R.N.
Surg. J. N. McB. Ross, M.C., R.N.
Capt. P. MacCullum, M.C., R.A.M.C.
Capt. W. Steadman, R.A.M.C.
Capt. H. C. Watson, R.A.M.C.
Lieut. L. N. Morris, R.A.M.C.
Major T. J. Frizell, Australian A.M.C.
Major T. M. Furber, Australian A.M.C.
Major H. Buck, M.C., Canadian A.M.C.
Surg. W. P. Starforth, R.N.
Lieut. E. H. Good, R.A.M.C.
Capt. W. R. Addis, R.A.M.C.
Lieut.-Col. H. Fulton, R.A.M.C.
Capt. K. A. MacCuish, Canadian, A.M.C.

CASUALTIES AMONG THE SONS OF MEDICAL MEN.

The following additional casualties among the sons of medical men are reported:—

Second Lieut. H. G. Turrell, Oxford and Bucks L.I., died of wounds, only son of Dr. W. J. Turrell, Oxford.

Lieut. F. K. Holton, Middlesex Regiment, killed in action, only son of Dr. F. W. P. Holton, Barking-road, London.

MENTIONED IN DESPATCHES.

In a despatch from Simla, dated July 23rd, 1917, dealing with military operations in the Indian Empire from March 10th, 1916, to March 31st, 1917, the names of the following medical officers are mentioned:—

Major C. E. W. S. Fawcett, R.A.M.C.; Lieut. B. S. Dhondy, I.M.S.; Capt. J. B. Hanafin, I.M.S.; Major D. Heron, I.M.S.; Capt. M. A. Rahman, I.M.S.

FOREIGN DECORATIONS.

Japanese.

Order of the Sacred Treasure, 1st Class.—Surg.-Gen. Sir A. W. May, K.C.B., K.H.P.

French.

Croix de Guerre.—Fleet-Surg. J. R. Muir, R.N.; Staff-Surg. W. T. Haydon, R.N.; Surg. H. E. R. Stephens, R.N.; Surg. R. G. Lyster, R.N.; Surg. H. P. Margetts, R.N.

OBITUARY OF THE WAR.

ROBERT HAIG SPITTAL, M.B., CH.B. ABERD.,

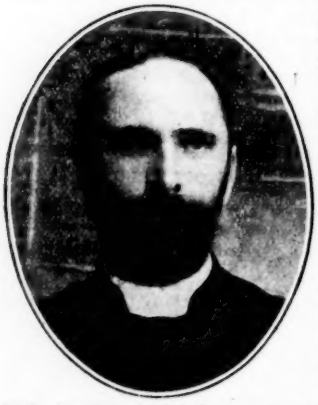
CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain R. H. Spittal, who was killed in action on Oct. 4th, was born at Ellon, Aberdeenshire, where his father was schoolmaster. Educated at Gordon's College, Aberdeen, and at Aberdeen University, where he obtained distinction in anatomy, he graduated M.B., Ch.B. in 1905. After a period as demonstrator of anatomy and as house surgeon at the Sick Children's Hospital, he left Aberdeen and settled in general practice first at Whaley Bridge, near Stockport, and then at Denton, joining Dr. John Murray in partnership at South Bank, Yorkshire, in 1912. On the outbreak of war he volunteered for service in the Royal Army Medical Corps, and was sent to Serbia, where he received the Order of St. Sara, 5th Class. After seeing service in Egypt and Malta, he was attached to a regiment in France, and remained there until his death. His partner writes of Captain Spittal as a man with a reserved manner, which did not prevent his kind and sympathetic nature becoming known to a wide circle of friends. He was a keen golfer.

ROBERT STERLING, M.A., M.B. DURH.,

CLERK IN HOLY ORDERS;
CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain R. Sterling, who recently died in a nursing home in London, was ordained in 1884 and took his medical degree three years later. After serving in two curacies he went to Gaza in 1892 to take charge of the hospital belonging to the Church Missionary Society. He was there when Turkey declared war in 1914, and after being kept as a hostage for a while was sent home from Jerusalem at the end of the year. On reaching England he obtained a commission in the R.A.M.C. and was sent to Egypt, where he remained until the early part of this year, when he was invalided home with an internal malady from the effects of which he died. Captain Sterling took a deep interest in the future of the Holy Land and would have warmly welcomed the fall of Gaza. At El Arish he opened and maintained a school and a dispensary for the benefit of the villagers. His popularity at Gaza resulted in the presentation of a cheque from the leading Moslems of the town as a token of their gratitude. Captain Sterling was honorary canon of St. George's, Jerusalem.



BENJAMIN ALLEN BULL, L.M.S.S.A.,

CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain B. A. Bull, who was killed in action on Sept. 16th at the age of 30 years, was only surviving son of Professor Bull, of Manchester. He was educated at Rydal Mount, Colwyn Bay, and at Jesus College, Oxford, obtaining first-class honours in Mathematical Moderations and a first class in the Final Honour School of Physiology. When war broke out he was a student at St. Bartholomew's Hospital. Offering his services to the Navy he acted for four months as surgeon probationer on the *Lysander*, returning to take his medical qualification in 1915. He then obtained a commission in the R.A.M.C. attached to a Home Counties Field Ambulance, and early this year went out to France with a battalion of the London Regiment. He was killed by a shell which burst outside his aid-post as he was tending a wounded man. Letters from fellow officers allude to Captain Bull's cheery spirit and devotion to duty; he had a gift of humour which was caustic without wounding, combined with a keen enjoyment of life. At Oxford he took a special interest in the problems of diabetes and read widely on the subject, so that his professor anticipated distinction for him if he had lived to follow up this work.

FREDERICK CHARLES DAVIES, M.A., M.B. CAMB., M.R.C.P.,

CAPTAIN, ROYAL ARMY MEDICAL CORPS.

Captain F. C. Davies, who was killed in action in France on Oct. 17th at the age of 33 years, was youngest son of William Davies, J.P., first mayor of Battersea. Educated at St. Paul's School, London, and Downing College, Cambridge, he completed his medical course at Charing Cross Hospital, qualifying in 1908 and holding house appointments there and at the West Ham Isolation Fever Hospital. In 1912 he became medical registrar to Charing Cross Hospital and later county tuberculosis officer for Cambridgeshire. He went to France early in August, 1914, was invalided home with typhoid fever a year later, and was then appointed registrar to a base hospital. Latterly he was attached as medical officer to the Northumberland Fusiliers, with whom he met his death.

A medical friend writes of Captain Davies: "He endeared himself to his friends by his engaging manner and kindly disposition. He was an indefatigable worker on any subject he was interested in, and there is no doubt that had he lived he would have attained a high position in his profession."

MEDICAL RE-EXAMINATION OF MEN FOR THE ARMY.

The Local Government Board have issued circulars addressed to local tribunals (R. 154) and appeal tribunals (R. 155) to guide them in regard to the medical re-examination of men who find themselves aggrieved by their grading under the new scheme of the Ministry of National Service. A six-page pamphlet of rules (R. 156) accompanies the circulars. Briefly, the rules provide that any man may apply to the Appeal Tribunal, within the stipulated time, against his grading by the National Service Medical Board, or, if he has applied to the board for a re-examination and been refused, against that refusal. If the Appeal Tribunal are satisfied that he has made out a sufficient case they may authorise him to be re-examined by their medical assessors.

MINISTRY OF NATIONAL SERVICE: ADVISORY BOARD FOR SCOTLAND.

The Minister of National Service has appointed an Advisory Medical Board for Scotland to assist him on matters relating to the examination of men of military age by the new medical boards, and the Secretary for Scotland will refer to the same board questions submitted by the medical assessors appointed by him. The members of the board are as follows:—Sir Donald Macalister, Dr. R. C. Buist, Dr. J. R. Drever, Dr. John Gordon, Professor Harvey Littlejohn, Professor T. K. Monro, and Dr. John Playfair.

THE AUXILIARY R.A.M.C. FUND.—The committee announce that the following amounts have been received for these funds during the quarter ending Sept. 30th.

Benevolent Officers' Branch, £249 7*s.* 3*d.*
Relief Branch, Wt. O., N.C.O.'s, and men, £1067 7*s.* 3*d.*

THE TREATMENT OF DISABLED SOLDIERS IN WALES.—Sir A. Griffith-Boscawen stated in Parliament last week that some 176 institutions, including military, auxiliary, and civil hospitals and convalescent homes, were in use in Wales and Monmouthshire, and open to the treatment of discharged disabled soldiers, and the Joint Disablement Committees set up by the Local War Pensions Committees and the Ministry have been invited to submit proposals for meeting any deficiencies in this respect. Schemes for establishing an after-care colony with training for tuberculosis and for at least one centre for orthopædic treatment are now under consideration. With regard to training, schemes have been sanctioned for cinema operating at Cardiff, cabinet-making and toy-making at Trefnant, and horticulture and market gardening at Wrexham Garden Village. Diamond-cutting and polishing will, it is hoped, be shortly established at Wrexham, and it is proposed to start a number of courses in various subjects at Cardiff. The western principality does not seem to lag behind in its care for the sick and disabled soldier.

URBAN VITAL STATISTICS.

(Week ended Nov. 3rd, 1917.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at nearly 17,000,000 persons, the annual rate of mortality was 12·6, against 12·0 per 1000 in each of the two preceding weeks. In London, with a population exceeding 4,000,000 persons, the death-rate was 13·0, or 0·2 per 1000 below that recorded in the previous week; among the remaining towns the rates ranged from 4·5 in Eastbourne, 5·2 in Carlisle, and 5·8 in Hornsey, to 19·9 in Middlesbrough, 20·9 in Stockton-on-Tees, and 21·7 in Brighton. The principal epidemic diseases caused 291 deaths, which corresponded to an annual rate of 0·9 per 1000, and included 114 from infantile diarrhœa, 60 from diphtheria, 56 from measles, 43 from whooping-cough, 14 from scarlet fever, and 4 from enteric fever. The deaths from diarrhœa, which had declined from 278 to 121 in the four preceding weeks, further fell to 114, and included 35 in London, 10 in Liverpool, 6 in Birmingham, and 5 each in Leicester and Manchester. The 1189 cases of scarlet fever and 1409 of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital were respectively 95 and 52 above the numbers remaining at the end of the previous week. Of the deaths from all causes in the 96 towns 153 resulted from violence. The causes of 34 deaths were uncertified, of which 7 were registered in Birmingham and 4 each in Portsmouth, Liverpool, and Rochdale.

Scotch Towns.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2,500,000 persons, the annual rate of mortality was 12·3, against 12·1 and 11·4 per 1000 in the two preceding weeks. The 256 deaths in Glasgow corresponded to an annual rate of 11·9 per 1000, and included 9 from diphtheria, 5 from whooping-cough, 4 each from measles and infantile diarrhœa, and 1 from scarlet fever. The 97 deaths in Edinburgh were equal to a rate of 15·2 per 1000, and included 3 each from whooping-cough and diphtheria and 1 from diarrhœa.

Irish Towns.—The 118 deaths in Dublin corresponded to an annual rate of 15·4, or 4·4 per 1000 in excess of that recorded in the previous week, and included 6 from infantile diarrhœa, 3 from measles, and 1 from diphtheria. The 94 deaths in Belfast were equal to a rate of 12·5 per 1000, and included 6 from infantile diarrhœa and 1 each from enteric fever, scarlet fever, and whooping-cough.

THE DISAPPEARANCE OF GLANDERS.—A report of the Birmingham corporation states that although possibly there may be some increase of glanders after the war, nevertheless, under the present regulations and modern accuracy in diagnosis, the final extermination of this dangerous disease will not probably be long deferred.

Medical News.

EXAMINING BOARD IN ENGLAND BY THE ROYAL COLLEGES OF PHYSICIANS OF LONDON AND SURGEONS OF ENGLAND.—At the Final Examination, held from Oct. 9th to 24th, the following candidates were successful in the subjects indicated:—

Medicine.—C. W. W. Armstrong, Guy's; K. E. Attenborough, St. Mary's; R. W. C. Ball, Middlesex; E. R. Batho, St. Bartholomew's; P. F. Bishop, Cambridge and St. Thomas's; J. C. Blake, University College; R. B. Britton, Bristol; Ellinor Marjorie Burnett, Royal Free; G. T. Calthrop, Cambridge and London; W. B. Christopherson, St. Bartholomew's; C. B Cohen, Cambridge and St. Thomas's; W. Collins, Sheffield; B. S. Cornell, Toronto; T. L. Crawhall, Cambridge and Durham; J. K. Datta, Calcutta; A. R. Doyle, Guy's; F. N. V. Dyer, Cambridge and St. Thomas's; S. D. A. El Daab, Cairo and St. Bartholomew's; A. A. H. El Zeneiny, London; J. T. T. Forbes, W. Gover, and W. H. Grace, Guy's; A. S. Green, University College; N. B. de M. Greenstreet, Cambridge and St. Thomas's; W. S. Gross, Cambridge and St. George's; C. W. Hayward, University College; C. B. Henry, Westminster; A. G. Hewer, Middlesex; H. A. Hill, Birmingham; R. Hilliard, London; C. P. Hines, St. George's; E. A. Holmes, King's College; J. Hope, Manchester; H. B. Jackson, Cambridge and St. Bartholomew's; M. Jackson, St. Bartholomew's; D. M. Jones, London; J. W. Jones, Middlesex; G. S. L. Kemp, Sheffield; D. M. Lala, King's College; F. W. M. Lamb, Birmingham; A. W. Lewis and G. E. MacAlevey, St. Mary's; J. T. C. McAuslin, Edinburgh; Malati Madgavkar, Birmingham; G. Meadows, Guy's; Daisy Kathleen Fairbairn Michael, Madras and Charing Cross; H. Morrison, Cambridge and St. Bartholomew's; G. E. Mullins, Birmingham; P. M. Neighbour, Cambridge and St. George's; J. Nel, Charing Cross; Freda Newman, Durham; E. Nissim, University College; E. J. Papenfus, St. Thomas's; W. H. Parr, London; A. L. S. Payne, Guy's; H. T. Prys-Jones, Cardiff and St. Mary's; D. C. Rennie, Birmingham; R. T. F. D. Roberts, Guy's; Gwendolen Mary Rolfe, Royal Free; P. Rustim, Bombay; A. R. Sami, St. Thomas's; G. A. S. Shacklock, Guy's; B. B. Sharp, St. Bartholomew's; G. H. Sims, St. Thomas's; P. W. Symons, Middlesex; G. B. Tarring, Oxford and Guy's; Edith Marjorie Thom, Cardiff and Royal Free; N. B. Thomas, St. Bartholomew's; W. S. Tunbridge, Oxford and St. Bartholomew's; W. R. Tutt, Toronto; M. D. Vint, Cambridge and London; P. E. Williams, St. George's; S. A. Withers, Guy's; and S. T. Wong, Guy's.

Surgery.—C. C. Beney, Cambridge and London; Ursula Poussett Blackwell, Royal Free; J. D'A. Champney, Bristol; W. Collins, Sheffield; B. S. Cornell, Toronto; C. G. S. Corner, Madras and University College; H. Corsi, Cambridge and St. Bartholomew's; T. L. Crawhall, Cambridge and Durham; F. B. Dutton, St. Thomas's; H. V. Edwards, Cambridge and St. George's; A. F. M. Fuoss and H. A. Hill, Birmingham; J. Hope, Manchester; R. M. Humphreys, Oxford and St. Thomas's; N. E. F. Kemm, Bristol; F. W. M. Lamb, Birmingham; G. B. Lowe, Cambridge and Birmingham; J. T. C. McAuslin, Edinburgh; E. J. Papenfus, St. Thomas's; A. V. Pegge, Cambridge and St. Bartholomew's; D. C. Rennie, Birmingham; W. M. Savery, Middlesex; C. K. Scales King's College; G. H. Sims, St. Thomas's; G. K. Stone, Oxford and St. Bartholomew's; E. B. Verney, Cambridge and St. Bartholomew's; and W. Worger, Bristol.

Midwifery.—Y. Abdel Messiah, Middlesex; J. F. Adams, Toronto; N. D. Ball, University College; L. S. Banes, St. Mary's; H. F. G. Berncastle, Guy's; H. Black, Toronto; M. C. Breese, Westminster; J. Brodetsky, London; W. E. Brown, Toronto; T. A. Butcher, University College; J. D. Byrd, Manchester and St. Bartholomew's; F. Cavers, University College; A. E. Clark-Kennedy, Cambridge and London; A. E. Collie, Cambridge and Middlesex; H. C. Cox, St. Bartholomew's; H. T. Cubbon, Cambridge and St. Thomas's; P. C. Datta, Edinburgh; I. Davies, Westminster; W. Davies, London; L. S. Debenham, Guy's; H. V. Edwards, Cambridge and St. George's; C. F. Eminson, Charing Cross; P. Faraci, Middlesex; G. H. FitzGerald, Guy's; H. P. Gabb, University College; C. Gill-Carey, Guy's; B. A. M. Gordon, London; Gwenvron Mary Griffiths, Royal Free; W. R. G. Harris, London; M. S. Hashish, St. Bartholomew's; W. E. Heath, Cambridge and St. Bartholomew's; C. L. Hewer, St. Bartholomew's; F. R. G. Hief and J. M. Higginton, Cambridge and St. Thomas's; C. P. Hines, St. George's; E. S. Jones, Birmingham; A. M. Kazim, University College; G. S. L. Kemp, Sheffield; E. F. Kerby, Guy's; A. O. Knight, Middlesex; H. J. Leviseur and A. K. D. Lewis, Guy's; G. S. Lewis, Bristol; S. S. Lindsay, St. Thomas's; N. H. Little, Toronto; J. J. M. MacDonnell St. Thomas's; J. A. Mackenzie, Manitoba; E. K. Maclellan, Dalhousie; Gladys Matthews, Royal Free; Daisy Kathleen Fairbairn Michael, Charing Cross; E. Miller, Cambridge and London; L. M. Moody, King's College; J. W. W. Newsome, Middlesex; Esther Novinsky, Royal Free; A. A. Osman, Guy's; Marguerite Henrietta Pam, St. Mary's; E. R. Peirce, Birmingham; J. Peter, Middlesex; L. D. Porteous, St. Bartholomew's; Mary Millicent Prior, St. Mary's; P. W. Putnam, Cambridge and London; P. G. Quinton and W. E. K. A. Quitmann, University College; Constance Amy Randall, Royal Free; R. H. Reece St. Bartholomew's; F. W. Reitz, Guy's; C. E. Rice, Cambridge and Birmingham; J. S. L. Roberts, University College; J. S. Rogers, King's College; C. C. Rowland and S. N. Sennett, London; A. G. Shurlock, Cambridge and St. Bartholomew's; W. H. Simmons, Guy's; G. J. Sophianopoulos, St. Bartholomew's; Frances Minnie Spickett, Royal Free; V. A. T. Spong, St. Bartholomew's; G. McK. Thomas, Guy's; G. R. Tilsley, Bristol; E. S. Toogood, Oxford and University College; W. R. Tutt, Toronto; J. E. de V. van der Merwe, Guy's; E. B. Verney, Cambridge and St. Bartholomew's; D. Wallice, Cambridge and London; J. P Wells, Cambridge and St. Bartholomew's; A. T. Westlake, St. Bartholomew's; S. C. de S. Wijeyeratne, University College; H. E. Williams, London; H. P. Williams, Liverpool; J. M. Winnett, London; F. G. Wood, Cambridge and St. Thomas's; and V. D. Wyborn, Charing Cross.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.—A Comitia was held on Oct. 25th, Sir Frederick Taylor, the President, being in the chair.—On the report of the Censors' Board the following candidates were admitted as Members: Dr. J. J. Conybeare, Dr. D. E. Fenwick, Dr. J. G. Greenfield, Dr. Helen M. M. Mackay, Dr. W. S. Sharpe, and Dr. J. C. Tull.—Eighty-nine candidates having conformed to the by-laws and regulations and passed the required examinations were granted licences to practise physic.—A report from the Committee of Management was adopted detailing a revision of the regulations relating to the Preliminary Examination in General Education.—Sir Dyce Duckworth was re-elected as the representative of the College upon the governing body of the University of Liverpool.—The Registrar proposed for the first time the following temporary by-law:—

That Dr. J. T. Calvert, who is resident in India, and Dr. Carey F. Coombs and Dr. Charles Singer, both of whom are detained abroad by military duties, be admitted to the Fellowship *in absentiâ*, any by-law to the contrary notwithstanding.

—A report from the Committee of Management, dated Oct. 2nd, was adopted as follows:—

1. That the following schools be added to the list of institutions recognised by the Board for instruction in chemistry and physics—namely, King Edward VII. Grammar School, Southampton; Lancing College.

3. The Committee recommend that the following school, which is already recognised for chemistry and physics, be also recognised for instruction in biology—namely, Bootham School, York.

—Dr. J. A. Ormerod was re-elected a member of the Committee of Management.—The President reported on the proceedings of the Committee of Reference during the past six months, and received the thanks of the College for his work on that committee.—The books and other publications presented to the College during the past quarter were submitted to the Comitia and thanks returned to the donors. After certain formal business the President dissolved the Comitia.

MATERNITY AND CHILD WELFARE.—In connexion with an exhibition on "Life-Saving in War-Time," held in the Belfast Municipal Library and Museum, the first of a series of lectures was delivered by Sir John Byers, on Oct. 23rd, the subject being "The Problem of Maternal and Child Welfare."

OPHTHALMIA NEONATORUM AND LOCAL AUTHORITIES.—In reply to a question in the House of Commons, Mr. Hayes Fisher, President of the Local Government Board, stated that it was the policy of the Board to press upon local authorities the great importance of arranging for hospital beds for infants suffering from ophthalmia neonatorum along with their mothers. Several of the larger local authorities had already made such arrangements. In the case of London the Metropolitan Asylums Board was prepared to provide two hospitals—one to serve the north of London and the other the south. Mr. Fisher added that 50 per cent. of approved expenditure under this head is repaid by the Board to local authorities out of the maternity and child-welfare grant, the grant being also available in aid of home nursing.

DONATIONS AND BEQUESTS.—The late Mr. George Gill, of Walsall, has left by will £1000 each to the Walsall and District Hospital and to the Walsall Victoria Nursing Institution.—By the will of Mr. Edward Sturdy, of Teddington, the testator has left £500 to the Royal Victoria Hospital, Bournemouth, and £200 each to the London Hospital and Queen Mary's Convalescent Hospital, Roehampton.—By the will of the late Mr. John Henry Welby the Charing Cross Hospital, the Royal Free Hospital, the London Hospital, and the Westminster Hospital will each receive £250.—The late Mr. Henry Woodward, of Shawclough, Rochdale, has left £500 each to Rochdale Infirmary and the Rochdale Memorial Home for Crippled Children.

A NATIONAL MEDICAL SERVICE FOR IRELAND.—At a recent meeting of the Irish Medical Committee a subcommittee to watch the interests of the Irish medical profession was appointed, and the secretaries and the chairman, Dr. R. J. Johnstone, were directed to communicate with the secretary of the Irish Convention to inform him of the attitude of their constituency regarding the establishment of a National Medical Service. In 1911 over 90 per cent. of the profession in Ireland declared in favour of the reform of Poor-law and other medical services in Ireland on the following lines: (1) A National Medical Service entered by examination, payment by the State of adequate salaries progressive according to service, and compulsory superannuation on retirement; (2) the establishment of a properly organised Public Health Service; (3) a system of hospitals accessible to all requiring treatment free from workhouse or pauper taint. The question of medical attendance on private patients in these hospitals should, it was pointed out, receive special consideration.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

National Health Insurance.

Sir E. CORNWALL has presented a Bill in the House of Commons "to amend the Acts relating to National Health Insurance." It has been read a first time.

Select Committee on Medical Examinations.

The Select Committee of the House of Commons, which was appointed to inquire into the subject of medical examinations and re-examinations under the Military Service Acts, has resumed its sittings. At its meeting on Tuesday, Nov. 6th, at which Colonel GRETTON presided, Dr. JAMES GALLOWAY again gave evidence. He has been asked to undertake the duties of Chief Commissioner of Medical Service. He explained at length the new arrangements regarding the establishment of the ten recruiting areas, in each of which there was a Deputy Commissioner of Medical Service acting under the Chief Commissioner. The new medical boards that were being set up were composed of civilian medical practitioners, and in the great majority of cases the policy of the Ministry of National Service was to employ as part-time officers civilian practitioners actually at work in the area. Full facilities were to be placed at the disposal of men who desired to be re-examined. He expressed the view that the new system would simplify classification of recruits.

HOUSE OF COMMONS.

WEDNESDAY, OCT. 31ST.

Medical Examinations for the Army.

In reply to Mr. WATT, Mr. MACPHERSON (Under Secretary for War) said: The honourable Member is right in suggesting that some men with only one eye have been passed for the lower categories of combatant service in the Army, those known as B 1 and C 1, but none of these are now being passed for any category of combatant service. At the present time men who have lost the sight of one eye, if otherwise fit, are passed only for one or other of the auxiliary services of the Army.

Soldiers Suffering from Nerve-Strain.

Sir A. GRIFFITH-BOSCAWEN (Parliamentary Secretary to the Ministry of Pensions) informed Mr. KING that the policy was to retain in the Army all cases of soldiers suffering from nerve-strain who were likely to be categorised as fit for some form of military duty. Those likely not to be so fit were retained until they could be transferred to the Pensions Ministry. He was not aware of any proposal to recall for treatment under military control soldiers invalided through nerve-strain who had been already discharged from the Army.

Mr. KING asked whether instructions had been given to local committees to provide appropriate convalescent homes for ex-soldiers suffering from nerve-strain who had been discharged unrecovered to their homes.—Sir A. GRIFFITH-BOSCAWEN replied: Local War Pensions Committees are empowered to provide convalescent treatment for discharged disabled men whatever the nature of their disablement. The policy of providing special institutions for the class referred to, except in so far as they are suffering from neurasthenia in a severe form and are in need of special medical treatment, is, in the opinion of my advisers, open to serious question. The provision of convalescent homes generally is, however, stated to be inadequate in certain districts, and I am instituting inquiry into the matter with a view to remedying the deficiency where it exists.

Grants in Aid to Voluntary Hospitals.

Sir W. COLLINS asked the Financial Secretary to the War Office whether, in view of the increases in price of food, fuel, drugs, &c., since the amount of the grants-in-aid to voluntary hospitals in respect of the treatment of wounded soldiers was fixed, it was proposed to raise the scale of such grants to these institutions.—Mr. FORSTER wrote in reply: Yes, Sir, this point has been under consideration for some time, and an announcement will shortly be made.

THURSDAY, NOV. 1ST.

Treatment of Disabled Soldiers.

Mr. ANDERSON asked the Parliamentary Secretary to the Ministry of Pensions whether he was considering how to provide curative treatment on scientific lines for all sailors and soldiers suffering from rheumatism and tuberculosis; and whether he would consider the desirability of making grants so that, in addition to their pension, they might reside in health institutions under the care of specialists until every effort toward cure was made, seeing that this would, even in the monetary sense, be cheaper than to grant them pensions

whilst at the same time allowing them to lapse into chronic invalids.—Sir A. GRIFFITH-BOSCAWEN answered: Under the instructions of the Ministry, Local War Pensions Committees have full powers to make arrangements with any existing institutions for the treatment of rheumatism, and those powers have been widely used. Should it be found that existing accommodation is insufficient, the Minister is ready to give assistance towards meeting the need. Treatment for tuberculosis is provided by the National Health Insurance Commissioners in conjunction with the local health authorities. In order that the disabled man may obtain the fullest advantage of their arrangements grants have been made to assist the funds of Insurance Committees and, in addition, the Minister has undertaken to provide the whole cost of treatment for advanced cases of this disease. Moreover, the Ministry are at present considering the question of providing after-care colonies where treatment and training may be given in cases of this disease in its early stages. The honourable Member may rest assured that every means possible will be adopted to bring about an effective cure wherever cure is possible.

Ministry of National Service and Medical Examinations.

Sir H. GREENWOOD asked the Minister of National Service what part of the Army Medical Services now under the War Office his department intended to take over.—Sir A. GEDDES answered: The Ministry of National Service has taken over from to-day that part of the functions of the Army Medical Service which is concerned with the medical examination of the physical fitness of recruits and potential recruits. The responsibility of the Army Medical Service for the performance of these functions passes completely to the Ministry of National Service. Civilian medical practitioners who have been employed on recruiting medical boards will, however, be eligible for re-employment under National Service.

Civilian Medical Men and Army Work.

Mr. PERKINS asked the Under Secretary for War whether every effort was made to utilise the services of those retired civilian medical men who would be willing to work as civil surgeons or to join the Royal Army Medical Corps provided that they could be employed at home in hospitals within reach of their own homes but who for personal or domestic reasons could not break up their homes in order to serve in other localities.—Mr. MACPHERSON wrote in reply: The employment of civilian medical men willing to work as civilian medical practitioners in the neighbourhood of their homes is one for general officers commanding in chief of the various commands. So far as the War Office is concerned such offers are welcomed.

MONDAY, NOV. 5TH.

Criminal Law Amendment Bill.

Mr. RAMSAY MACDONALD asked the Home Secretary whether, in view of the state of public business and the unlikelihood of any progress being made with the Criminal Law Amendment Bill this session, he would consider whether he could use his powers under the Defence of the Realm Act or otherwise to provide safeguards against the worst dangers by which soldiers were beset and the grossest carelessness in communicating disease.—Sir G. CAVE replied: I regret the opposition to the Criminal Law Amendment Bill, the passage of which would, in my opinion, reduce the evil referred to in the question. It is for the Army Council to consider whether anything can be effected by a Regulation under the Defence of the Realm Act.

The Course of Instruction in the Royal Army Medical Corps.

Replying to Major DAVID DAVIES, Mr. MACPHERSON wrote: Medical men commissioned as officers in the Royal Army Medical Corps undergo a short course of instruction in their military duties, and much importance is attached to this training, which is not confined to drill, but includes military sanitation, anti-gas protection, and the duties of a medical officer with troops in the field. It is not proposed to abolish this special training, which is considered essential to the efficiency of the officers concerned.

Hospitals for Venereal Disease.

Mr. ARNOLD WARD asked the Under Secretary for War whether military hospitals for venereal disease were being located in or near urban districts in the Eastern Command; whether the local authorities had protested against this action; and whether in such cases regard would be had to the wishes of the local residents.—Mr. MACPHERSON wrote in reply: The concentration of patients suffering from venereal diseases in special hospitals under expert treatment ensures the utmost advantage to health and the speedy return of men to duty. The location of such hospitals in all commands is a matter of difficulty. Feeling is strong against the use of buildings for the purpose, and it has become necessary to utilise hut-ments which are the property of the Government. In every instance, not only in the Eastern Command, there has been strong local opposition to the location of hospitals of this nature. Every possible consideration has been given to representations, but there being no alternative, the hospitals have been located in hut-ments which could be spared, having regard to other military considerations.

TUESDAY, NOV. 6TH.

Medical Services in Mesopotamia.

Major DAVID DAVIES asked the Under Secretary for War whether Surgeon-General Sir William Babtie was appointed to his present position as Director of Medical Services at the War Office in recognition of the services he rendered in Mesopotamia; whether the causes of the breakdown of the medical services in Mesopotamia had been examined by any court-martial or court of inquiry; and whether the Army Council was satisfied as to what officer or officers must be held responsible for the breakdown of the medical services in Mesopotamia.—Mr. MACPHERSON replied: Surgeon-General Sir William Babtie was Director of Medical Services at the War Office before the report of the Mesopotamia Commission was issued. After the appearance of the report he was given leave pending its consideration. As I have already stated, Sir William Babtie submitted his explanation to the Army Council, who found it satisfactory, and he was recalled from leave to resume his official duties. I added that the Council still awaited the explanation of the other officers. From this it might be inferred, indeed it has been inferred, that these officers were called upon for their explanations at the same time as Sir William Babtie, and that they failed to submit them within a reasonable time. Such is not the case, and I regret very much that my reply should have given any ground for an inference both unwarrantable and unjust and prejudicial towards the distinguished officers concerned, who are, and have been, anxious to offer their explanations. Until all the explanations have been received I cannot answer the last part of my honourable friend's question.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

BARBOUR, D., M.B., Ch.B. Glasg., has been appointed Certifying Surgeon under the Factory and Workshop Acts for the Muirkirk District of the County of Ayr.

CHEYNE, Sir W. WATSON, K.C.M.G., C.B., F.R.S., Consulting Surgeon to King's College Hospital.

CUMMINS, W. E. A., M.D. R.U.I., one of the Medical Referees under the Workmen's Compensation Act, 1906, for the West Riding of the County of Cork (Macroom and Bandon Divisions) and for the portion of the East Riding of the County, including Cork City and Cork East Riding, except the towns of Passage Monkstown and Queenstown.

GOLDSMITH, B. K., M.B., Ch.B. Edin., D.P.H., Temporary Assistant Medical Officer of Health for Manchester.

GRANT, A. B., HIRCHMAN, N., and PONDER, E., Resident Surgeons to the Edinburgh Royal Infirmary.

KING, J. C., M.R.C.S., L.R.C.P. Lond., Certifying Surgeon under the Factory and Workshop Acts for the Barry District of the County of Glamorgan.

LEAKEY, C. M., L.M.S.S.A., Certifying Surgeon under the Factory and Workshop Acts for the Gunnislake District of the County of Cornwall.

TREADWELL, O. F. N., F.R.C.S. Eng., one of the Commissioners under the Prison Act, 1877.

Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index).
When the application of a Belgian medical man would be considered the advertisers are requested to communicate with the Editor.

BETHNAL GREEN BOARD OF GUARDIANS.—Temporary Medical Superintendent. Salary at rate of £550 per annum, with board, &c.

BIRKENHEAD AND WIRRAL CHILDREN'S HOSPITAL, Woodchurch-road.—House Surgeon.

BRISTOL ROYAL INFIRMARY.—House Physician and House Surgeon. Salary at rate of £120 per annum, with board, &c.

BURY INFIRMARY.—Junior House Surgeon. Salary £150 per annum, with board, &c.

EAST LONDON HOSPITAL FOR CHILDREN, Shadwell, E.—Resident Medical Officer. Salary £150 per annum, with board, &c.

GLAMORGAN COUNTY COUNCIL.—Temporary Female Medical Officer for medical inspection of children in public elementary schools. Salary at rate of £300 per annum.

HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, Brompton.—House Physician for six months. Salary 30 guineas.

LIVERPOOL COUNTY ASYLUM, Rainhill.—Temporary Assistant Medical Officer. Salary 7 guineas per week, with board, &c.

MAIDSTONE, WEST KENT GENERAL HOSPITAL.—Assistant House Surgeon. Salary £125 per annum, with board, &c.

MANCHESTER CHILDREN'S HOSPITAL, Pendlebury, near Manchester.—Female Resident Medical Officer, unmarried. Salary at rate of £200 per annum.

MANCHESTER ROYAL INFIRMARY.—Resident Surgical Officer, £225 per annum; Assistant Resident Surgical Officer; Accident Room House Surgeon; and Resident Medical Officer, Central Branch. £200 per annum each.

NETLEY, WELSH HOSPITAL.—Medical Officer. Salary at rate of £400 per annum, with board, &c.

NORTHAMPTONSHIRE SANATORIUM, Creaton, near Northampton.—Medical Superintendent. Salary £500 per annum, with board, &c.

NORTH-EASTERN HOSPITAL, St. Ann's-road, Tottenham, N.—Female Resident Temporary Assistant Medical Officers. Salary 7 guineas per week.

NOTTINGHAM GENERAL HOSPITAL.—Female Casualty House Surgeon for six months. Salary at rate of £250 per annum, with board, &c.

PADDINGTON GREEN CHILDREN'S HOSPITAL, London, W.—Female Resident Medical Officer. Salary at rate of £160 per annum, with board, &c.

PRESTON ROYAL INFIRMARY.—Resident Medical and Surgical Officer. Salary £120 per annum, with board, &c.

READING, ROYAL BERKSHIRE HOSPITAL.—House Surgeon for six months. Salary £275 per annum, with board, &c.

ROTHERHAM HOSPITAL.—Junior House Surgeon. Salary £150, with board, &c.

ROYAL EYE HOSPITAL, St. George's Circus, Southwark, S.E.—House Surgeon. Salary at rate of £150 per annum, with board, &c.

SURREY COUNTY COUNCIL.—Medical Officers for Mother and Infant Welfare and School Work. Salary £400 per annum.

SWANSEA UNION.—Resident Assistant Medical Officer to the Institution. Salary £300 per annum.

THE Home Secretary gives notice that he proposes to appoint a Medical Referee under the Workmen's Compensation Act, 1906, for County Court Circuit No. 9, and to be attached more particularly to the Stockport, Ashton-under-Lyne, and Stalybridge and Hyde County Courts. Applications should be addressed to the Private Secretary, Home Office, not later than Nov. 23rd, 1917.

THE Chief Inspector of Factories, Home Office, S.W., gives notice of a vacancy for a Certifying Surgeon under the Factory and Workshop Acts at Bangor, Carnarvon.

Births, Marriages, and Deaths.

BIRTHS.

CAMPBELL.—On Nov. 1st, at the Priory Nursing Home, Cambridge, the wife of Lieutenant-Colonel R. D. Campbell, D.S.O., A.A.M.C., of a son.

FURBER.—On Oct. 17th, at Spero, Salisbury, the wife of Major T. Maynard Furber, A.A.M.C., of a daughter.

GWYNNE HOWELL.—On Oct. 29th, at Llanelwedd Hall, Builth, Wells, the wife of Captain F. D. Gwynne Howell, D.S.O., M.C., R.A.M.C., of a son (stillborn).

LAMBKIN.—On Nov. 3rd, at Grove Lodge, Ingatestone, the wife of Temporary Lieutenant-Colonel E. C. Lambkin, R.A.M.C., of a daughter.

WATSON.—On Nov. 1st, at Earlham-road, Norwich, the wife of Dr. Henry Watson, of a son.

MARRIAGES.

ALDRIDGE—KNEVITT.—On Monday, Nov. 5th, 1917, at Emanuel Church, Plymouth, by the vicar, the Rev. Dr. Flynn, Charles Aldridge, M.D., of Belle Vue House, Plympton, S. Devon, to Edith Knevitt, of 4, Thom Park Terrace, Mannamead, Plymouth.

CROSBIE—GILLILAND.—On Oct. 30th, at St. Augustine's Church, Londonderry, Captain Douglas E. Crosbie, M.C., R.A.M.C., to Meg, only child of Mr. and Mrs. Robert K. Gilliland, Ardcalen, Londonderry.

SHIRES—ROBINSON.—On Oct. 31st, at All Saints Church, Bentley-road, Sefton Park, Liverpool, Captain Bertram Shires, R.A.M.C., to Vera, only daughter of the late Mr. and Mrs. Wellburn Grainger Robinson, Meadowfield, Whitby, Yorkshire.

DEATHS

BRISTOW.—On Nov. 1st, at Amesbury-avenue, Streatham-hill, S.W., George Hamilton Bristow, M.D., F.R.C.S.I., aged 50.

ELLISON.—On Nov. 1st, at Eton, Lieutenant-Colonel William Augustine Ellison, M.V.O., M.D., Surgeon to His Majesty's Household at Windsor.

MARTIN.—On Nov. 5th, at The Gables, Crawley, Sussex, Timothy Henry Martin, J.P., M.R.C.S., L.S.A., aged 80.

MCVAIL.—At 3, St. James's-terrace, Glasgow, on Nov. 4th, Sir David Caldwell McVail, M.B., F.R.F.P.S.G.

O'KELLY.—On Oct. 30th, at the residence of her uncle, George Wilson, Esq., Slaney-road, Walsall, Sarah (Sallie), dearly beloved wife of Captain Fitzgerald O'Kelly, R.A.M.C., of Cross Lodge, Boldon, Newcastle-on-Tyne, age 33.

WHIPHAM.—On Nov. 3rd, at Fishleigh House, Hatherleigh, Devon, Thomas Tillyer Whipham, M.D. Oxon., F.R.C.P. Lond., Consulting Physician to St. George's Hospital, aged 78 years.

N.B.—A fee of 5s. is charged for the insertion of Notices of Births, Marriages, and Deaths.

METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, Nov. 7th, 1917.

Date.	Rain-fall.	Solar Radio in Vacuo.	Maximum Temp. Shade.	Min. Temp.	Wet Bulb.	Dry Bulb.	Remarks.
Nov. 1	...	56	56	42	50	50	Overcast
" 2	0·05	63	59	49	55	55	Overcast
" 3	0·09	54	53	50	50	50	Raining
" 4	0·33	74	54	49	47	49	Fine
" 5	...	61	54	38	40	40	Fine
" 6	0·05	79	55	40	53	54	Raining
" 7	0·06	68	49	45	44	46	Cloudy

Other information which we have been accustomed to give in these "Readings" is withheld for the period of the war.

Notes, Short Comments, and Answers to Correspondents.

A MEDICAL PRACTITIONER AND A CORONER.

To the Editor of THE LANCET.

SIR,—On Oct. 4th I was called to see an old patient whom I had previously attended for chronic valvular disease of the heart. She was in bed and complained of pain over the region of the stomach with sickness. I prescribed for her and saw her again the next day when she was considerably relieved, and asked me not to come too often. However, on the 8th I saw her again, when she showed signs of ascites with swelling of feet and legs. The bowels had been freely opened daily, the sickness had ceased, and she was better in every way. On the 11th I saw her again; there was an increase of fluid made out by palpation and percussion; the bowels had acted and she had not been sick. However, as she was more or less by herself all day, and did not wish me to call too often, I suggested that she should go to the infirmary, and gave her a note for the relieving officer, as I thought in the event of tapping being required she would be better looked after. I heard no more until the following Monday, the 15th, when the coroner's officer came to me and handed me a subpœna to attend an inquest on my patient the next day. He told me that she had been admitted to the infirmary and was placed on the table for operation and died under the anæsthetic. At a subsequent post-mortem it had been found that she had intestinal obstruction, peritonitis, abscess in the pelvis, and commencing cancer of lower bowel.

At the coroner's court the next day I gave evidence, having been called by the coroner. I was submitted to a cross-examination as to my method of treatment and the drugs I had given, and was asked why I had not discovered all the things found after death by the pathologist, Dr. R. S. Trevor. I protested against this, for every medical man will know how easy it is to be wise after the event. Moreover, I was not present at the post-mortem, not having been notified that this was going to take place, and I could not accept the coroner's statement, which I could not verify. The patient had not shown any symptoms pointing either to intestinal obstruction, cancer, or abscess in the pelvis, and 36 hours had elapsed from the time of the examination. The coroner who had summoned me told me brusquely to "*Stand down*," because I disagreed with his view that I ought to have discovered things of which there were no symptoms during the life of the patient.

I received no fee for attendance, and on application to the coroner's officer next day I was told over the telephone by that officer that he had instructions from the coroner *not to pay me*. I then made a formal application to the coroner direct, and next morning the officer handed me the fee, remarking that he had made a mistake in giving me a subpœna, "*that the coroner merely wanted me to be there—in my own interests.*"—I am, Sir, yours faithfully,

JAMES SMYTH, M.D.

Wandsworth Common, S.W., Oct. 21st, 1917.

*** We have compared a long report of the inquest which appeared in the *South-Western Star* on Friday, Oct. 19th, with Dr. Smyth's letter, and his account of the proceedings is substantially supported thereby. The patient's cardiac condition accounted for her prominent symptoms, while no signs pointed especially to malignant stricture, nor did any of her complaints indicate the existence of such a condition. When it became obvious that she would have to go to an institution for operation Dr. Smyth rightly recommended this course to her. At the infirmary it was decided to operate for intestinal obstruction, and the patient died during the administration of the anæsthetic. At the post-mortem examination the disease of the heart and large blood-vessels, which had been recognised by Dr. Smyth, were found, and, in addition, malignant disease of the intestine. Mr. Oddie, the coroner whose duty it was to inquire into the cause of death of the patient, subpœnaed Dr. Smyth and inquired why he had not found, while the woman was alive, the malignant disease which, after death, was discovered. Dr. Smyth replied correctly in pointing out that he was not present at the post-mortem examination, so that he did not know from personal observation what conditions other than those which he had himself discovered were actually present. But at this point in his evidence, according to the report in the *South-Western Star*, "'Stand down,' said the coroner abruptly." Dr. Smyth seems to us to have done everything that he could in the interest of his patient while she was alive and to have given proper evidence at the inquest. Comment on the case in the *South-Western Star* commences with the following sentence: "It would be regrettable if there should be any renewal of the strained relations which at one time existed in this district between the

coroner and members of the medical profession." We have no idea what the reference to "strained relations" means, but we recommend that when medical witnesses are subpœnaed by a coroner "in their own interests" they should have those interests watched over in court by their legal advisers.—ED. L.

MEDICAL MATTERS IN BERLIN.

THE Berlin correspondent of the Munich *Medical Journal* gives a graphic picture of medical matters in Berlin during the early October weeks. A public exhibition is being held in the Kaiserin Friedrich's House to keep up the interest in small-pox awakened by the epidemic of last spring. In this exhibition the work of Jenner is properly recognised. The question of fees is agitating the medical profession in Berlin. The public, on the one hand, inclines to think that the extra work laid on doctors brings with it a sufficiently increased income, while the doctors themselves point out that this does not balance the all-round additions to the cost of living. The difficulty of heating the consulting-room affects not only the medical man, but the patients who visit him. On cold wintry days it is hardly fair to ask a patient to disrobe to be examined, and to forgo this makes the consultation of doubtful value. The amenities of city practice are gone. It is becoming more and more difficult to get about. A taxi-cab is a rarity; travel by tram, omnibus, or underground railway wastes much time, the longer period occupied in the crowded journeys being almost unbearable. The insufficient, almost absent, street lighting in the later hours of the night makes a visit at this time an adventure. The doctor, called out of his nocturnal rest, frequently finds himself translated into rural conditions unfamiliar to him, and it is only with a lantern that he can safely go abroad. The correspondent concludes with these words: "Nevertheless, all these inconveniences we shall have to bear without complaint, for we know that they are unavoidable for the moment."

TREATMENT OF THE INVALIDED SAILOR OR SOLDIER.

To the Editor of THE LANCET.

SIR,—The statement in THE LANCET of Oct. 27th (p. 655) by the Gloucester Local Medical and Panel Committee that it is unfair for the above treatment to be given by non-panel men as well an panel men (and which seems to be endorsed by you) is so unjust that I venture to ask you to reconsider your opinion. In the first place, it is merely carrying out the promise of the author of the Bill of freedom of choice of doctor for the patient by contracting out if his doctor was not on the panel, and freedom for the doctor by attending on the pooling system if he did not wish to work under the Act. In the second place, taking this town as an example, more than one-third of the profession held, and still hold, to their word and the "scrap of paper" they signed some years ago. Owing to the action of the Local Insurance Committee, almost none of their patients were allowed to contract out, and so the panel men got several hundred patients of the non-panel men. This never troubled them, but if the panel men now object to these sailors and soldiers being allowed the choice of going to the non-panel men, then the injustice and absurdity of the complaint is so great as to be almost ludicrous.—I am, Sir, yours faithfully,

RAYMOND H. SHAW, M.S., M.B. Durh.

Great Yarmouth, Oct. 30th, 1917.

*** But we did not endorse the statement attributed to the Gloucestershire Local Medical and Panel Committee.—ED.L.

"CELESCO."

IN our issue of Sept. 1st we published an analytical notice of a preparation named "Teekoe," which was offered as an economic substitute for tea, coffee, and cocoa. We found that its basis was reduced cocoa shell, which yields notable amounts of theobromine, fat, and proteins when treated with boiling water, and, moreover, the "tea" so obtained is quite agreeable to the palate and not "stodgy." We now understand that this preparation is shortly to be put on the market under the name of "Celesco," and a recent sample submitted to us gave results on analysis identical with those given by "Teekoe." The newer preparation shows an improvement in regard to the uniformity of the flakes. It yields a mild, stimulating and nutritive infusion.

C. J.—There is already a station in the district where the deposit is collected, and the results appear in our monthly returns. The attention of the Advisory Committee on Atmospheric Pollution (47, Victoria-street, Westminster, London, S.W. 1) might be called to the matter.

The following journals, magazines, &c., have been received:—Annales de Medecine, Practitioner, American Journal of Surgery, Journal of the Missouri State Medical Association, British Journal of Ophthalmology, British Journal of Dermatology, American Journal of Medical Sciences, National Medical Journal, British Dental Journal, Annali di Medicina Navale e Coloniale, Bulletin of the Johns Hopkins Hospital, Pacific Medical Journal, Medico-Legal Journal.

Medical Diary for the ensuing Week.

SOCIETIES.

ROYAL SOCIETY, Burlington House, London, W.

THURSDAY.—Papers:—Mr. A. P. Laurie and Mr. C. Ranken: Investigation into the Imbibition exhibited by Some Shellac Derivatives (communicated by Prof. J. Walker).—Mr. G. I. Taylor: Phenomena connected with Turbulence in the Lower Atmosphere (communicated by Sir Napier Shaw).—Mr. E. G. Bilham: On the Relation between Barometric Pressure and the Water Level in a Well at Kew Observatory (communicated by Sir Napier Shaw).

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Thursday, Nov. 15th.

DERMATOLOGY (Hon. Secretaries—J. E. R. McDonagh, H. MacCormac; Acting Hon. Secretary—S. E. Dore): at 5 P.M.
Cases will be shown at 4.30 P.M.

Friday, Nov. 16th.

OTOLOGY (Hon. Secretaries—Somerville Hastings, J. F. O'Malley): at 5 P.M.
Address by the President, Dr. H. Banks Davis.
Paper: Mr. T. Mark Hovell: Menière's Symptoms, their Causation and Treatment.
Cases will be shown by the President (Dr. H. J. Banks Davis), Dr. Dundas Grant, Mr. E. D. D. Davis, Mr. Somerville Hastings, and others.

ELECTRO-THERAPEUTICS (Hon. Secretaries—E. P. Cumberbatch, R. Knox): at 8.30 P.M.
CLINICAL EVENING.—Cases, radiograms, &c., will be shown.

MEDICAL SOCIETY OF LONDON, 11, Chandos-st., Cavendish-sq., W.

MONDAY.—8.30 P.M., Discussion on the Value and Limitations of Sanatorium Treatment for Tuberculosis:—(1) Dr. T. D. Lister: Introduction; (2) Dr. D. Lawson: As regards the Well-to-do; (3) Dr. N. Bardswell: As regards the Middle Classes; (4) Dr. W. O. Meek: As regards the Working Classes. (The Discussion to be continued on the following Monday.)

SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 11, Chandos-street, Cavendish-square, W.

FRIDAY.—Papers:—Dr. A. T. Ozzard: Some Sanitation Problems of the Sugar Estates and Villages of British Guiana.—Read for Dr. A. J. Chalmers and Dr. R. Pekkola: Enteromonas hominis da Fonseca 1915. Dr. A. C. Stevenson will show Some Specimens of Trypanosomes in the Brain of Guinea-pigs.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East.

TUESDAY AND THURSDAY.—5 P.M., FitzPatrick Lectures:—Dr. A. Chaplin. Medicine in England during the Reign of George III.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.

Museum Demonstrations (Pathology) for Medical Students and Practitioners and First-Aid and Ambulance Students:—
MONDAY.—5 P.M., Mr. S. G. Shattock: Inflammation and Gunshot Injuries.

POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

MONDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye. Dr. Simson: Diseases of Women.
TUESDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.
WEDNESDAY.—10 A.M., Dr. Arthur Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.
THURSDAY.—2 P.M., Medical and Surgical Clinics. X Rays. Mr. Gray: Operations. Mr. B. Harman: Diseases of the Eye.
FRIDAY.—10 A.M., Dr. Simson: Gynæcological Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Baldwin: Operations. Dr. Banks Davis: Diseases of the Throat, Nose, and Ear. Dr. Pernet: Diseases of the Skin.
SATURDAY.—10 A.M., Dr. Arthur Saunders: Diseases of Children. Dr. Banks Davis: Operations of the Throat, Nose, and Ear. Mr. B. Harman: Eye Operations. 2 P.M., Medical and Surgical Clinics. X Rays. Mr. Pardoe: Operations.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N. 15

MONDAY.—2.30 P.M., Children's Diseases: Dr. T. R. Whipham. Gynæcological Diseases: Mr. F. L. Provis. Surgical Operations: Mr. E. Gillespie. 3 P.M., Medical In-patients: Dr. R. M. Leslie. 7 P.M., Venereal Clinic: Dr. Kinsella.
TUESDAY.—10 A.M., Surgical Operations: Mr. J. Howell Evans. 2.30 P.M., Medical Out-patients: Dr. A. G. Auld. Surgical Out-patients: Mr. Howell Evans. Nose, Ear, and Throat Diseases: Mr. C. H. Hayton. X Rays: Dr. Metcalfe. 3.30 P.M., Medical In-patients: Dr. A. J. Whiting. Special Demonstration:—Mr. Howell Evans: Serious Abdominal Injuries from Slight Traumatisms.
WEDNESDAY.—2.30 P.M., Medical Out-patients: Dr. T. R. Whipham. Diseases of the Skin: The Dermatologist. Eye Diseases: Mr. A. S. Worton. Operations:—Nose, Ear, and Throat: Mr. Hayton; 4 P.M., Eyes: Mr. Worton. 5 P.M., Venereal Clinic: Mr. E. Gillespie and Mr. Benians.
THURSDAY.—2.30 P.M., Medical Out-patients, Dr. A. J. Whiting. Surgical: Mr. H. W. Carson. X Rays: Dr. Metcalfe. Gynæcological Operations: Dr. A. E. Giles. 3.30 P.M., Medical In-patients: Dr. R. M. Leslie.
FRIDAY.—2.30 P.M., Surgical Out-patients: Mr. Gillespie. Eye Diseases: Mr. A. S. Worton. 7 P.M., Venereal Clinic: Mr. E. Gillespie and Mr. Benians.
SATURDAY.—2.30 P.M., Surgical Operations: Mr. H. W. Carson.

MANAGER'S NOTICES.

TO SUBSCRIBERS.

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